STERKIANA

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CONTENTS

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ANNOUNCEMENT

STERKIANA is named after Dr. Victor Sterki (1846-1933) of New Philadelphia, Ohio, famed for his work on the Sphaeriidae, Pupillidae, and Valloniidae. It is fitting that this serial should bear his name both because of his association with the Midwest and his lifelong interest in non-marine Mollusca.

The purpose of STERKIANA is to serve malacologists and paleontologists interested in the living and fossil non-marine Mollusca of North and South America by disseminating information in that special field. Since its resources are modest, STERKIANA is not printed by conventional means. Costs are kept at a minimum by utilizing various talents and services available to the Editor. Subscription and reprint prices are based on cost of paper and mailing charges.

STERKIANA accepts articles dealing with non-marine Mollusca of the Americas in English, French, or Spanish, the three official languages of North America. Contributors are requested to avoid descriptions of new species or higher taxa in this serial as the limited distribution of STERKIANA would probably prevent recognition of such taxa as validly published. Papers on distribution, ecology, and revised checklists for particular areas or formations are especially welcome but those on any aspect of non-marine Mollusca will be considered.

STERKIANA will appear twice a year or oftener, as material is available. All correspondence should be addressed to the Editor.

SUBSCRIPTIONS: 50¢ per number; subscriptions may be entered for not more than 4 numbers in advance; please make checks and money orders payable to the Editor.

STERKIANA est une collection de travaux sur les Mollusques extra-marins des deux Amériques, distribuée par un groupe de malacologues du centre des Etats-Unis. STERKIANA publie des travaux en anglais, en français et en espagnol acceptés par le conseil de rédaction. Prière d'adresser toute correspondance au Rédacteur.

ABONNEMENT: 50¢ le numéro, par chèque ou mandat payable au Rédacteur.

STERKIANA es una coleccion de trabajos sobre los Moluscos extra-marinos viventes y fosiles de las dos Americas, editada por un grupo de malacólogos de los Estados Unidos centrales. Contenirá en el porvenir trabajos en inglés, francés, y español que serán acceptados por la mesa directiva. La correspondencia deberá ser dirigida al Editor.

PRECIO: 50¢ el número.

LAND SNAILS FROM THE PLEISTOCENE OF SOUTHERN TEXAS

LESLIE HUBRICHT

3235 - 23rd Ave., Meridian, Mississippi

Of the nine Pleistocene localities reported on here, seven are loess. These contain such northern and mountain species as Discus cronkhitei, Pupilla blandi, Cionella lubrica f. exigua, Vallonia gracilicosta, and Pomatiopsis lapidaria which indicate that the climate was colder and wetter when these deposits were laid down than at present. The other two localities are silt deposits. The Kendall County locality contains no species not found in the region today, and was probably deposited much later than the loess. The Brooks County locality contained large numbers of freshwater shells of northern species such as Valvata tricarinata (Say) as well as such southern species as Lyrodes sp. The land snail fauna would indicate that the climate was wetter and a little colder than at present. The aquatic species, most of which are species of permanent bodies of water, would also indicate that the climate was much wetter than at present. At present Palo Blanco Creek is a dry wash.

COMAL County: loess, near Guadalupe River, 1.5 miles north of Sattler.

Polygyra texasiana (Moricand)
Polygyra mooreana (W. G. Binney)
Stenotrema leai aliciae (Pilsbry)
Praticolella berlandieriana (Moricand)
Bulimulus mooreanus (Pfeiffer)
Retinella roemeri (Pilsbry & Ferriss)
Hawaiia minuscula (Binney)
Discus cronkhitei (Newcomb)
Helicodiscus eigenmanni Pilsbry
Helicodiscus singleyanus (Pilsbry)
Succinea sp.
Strobilops texasiana Pilsbry & Ferriss
Gastrocopta armifera (Say)
Gastrocopta clappi (Sterki)
Gastrocopta contracta (Say)
Gastrocopta pentodon (Say)
Gastrocopta procera sterkiana Pilsbry
Pupoides albilabris (C. B. Adams)
Pupilla blandi Morse
Cionella lubrica f. exigua (Menke)
Vallonia parvula Sterki
Vallonia gracilicosta Reinhardt
Helicina orbiculata tropica Pfeiffer
Pomatiopsis lapidaria (Say)

Gastrocopta armifera and G. clappi are commonly found together in central Kentucky and are easily separable. The smaller and more cylindrical shell of G. clappi enables one to separate the two forms at a glance. G. clappi is undoubtedly specifically distinct from G. armifera.

BEXAR County: Loess, near San Antonio River, 5 miles south of San Antonio.

Stenotrema leai aliciae (Pilsbry)
Praticolella berlandieriana (Moricand)
Bulimulus mooreanus pecosensis Pilsbry Ferriss
Mesomphix friabilis (W. G. Binney)
Discus cronkhitei (Newcomb)
Gastrocopta armifera (Say)
Helicina orbiculata tropica Pfeiffer

COMAL County; loess, near Guadalupe River, 2.5 miles south of Sattler.

Polygyra texasiana (Moricand)
Polygyra mooreana (W. G. Binney)
Stenotrema leai aliciae (Pilsbry)
Praticolella berlandieriana (Moricand)
Bulimulus mooreanus (Pfeiffer)
Retinella roemeri (Pilsbry & Ferriss)
Retinella indentata paucilirata (Morelet)
Hawaiia minuscula (Binney)
Helicodiscus eigenmanni Pilsbry
Strobilops texasiana Pilsbry & Ferriss
Gastrocopta armifera (Say)
Gastrocopta contracta (Say)
Cionella lubrica f. exigua (Menke)
Helicina orbiculata tropica Pfeiffer

BEXAR County; Loess, near San Antonio River, 5 miles south of San Antonio.

Stenotrema leai aliciae (Pilsbry)
Praticolella berlandieriana (Moricand)
Bulimulus mooreanus pecosensis Pilsbry & Ferriss
Mesomphix friabilis (W. G. Binney)
Discus cronkhitei (Newcomb)
Gastrocopta armifera (Say)
Helicina orbiculata tropica Pfeiffer

KENDALL County; silt, near Guadalupe River, 9 miles north of Boerne.

Polygyra auriformis (Bland)
Polygyra texasiana (Moricand)
Polygyra mooreana (W. G. Binney)
Praticolella berlandieriana (Moricand)
Bulimulus mooreanus (Pfeiffer)
Bulimulus dealbatus (Say)
Retinella roemeri (Pilsbry & Ferriss)
Retinella indentata paucilirata (Morelet)
Hawaiia minuscula (Binney)
Helicodiscus singleyanus (Pilsbry)
Succinea sp.
Strobilops texasiana Pilsbry & Ferriss
Gastrocopta contracta (Say)
Gastrocopta procera sterkiana Pilsbry
Gastrocopta pellucida hordeacella (Pilsbry)
Pupoides albilabris (C. B. Adams)
Helicina orbiculata tropica Pfeiffer

Bulimulus mooreanus is apparently a recent arrival in Texas. It is found only in the very top layers of the deposits, whereas *B. dealbatus* occurs in the lower layers. They were never found mixed.

KERR County; loess, near Johnson Creek, just west of Ingram.

Polygyra mooreana (W. G. Binney)
Stenotrema leai aliciae (Pilsbry)
Praticolella berlandieriana (Moricand)
Retinella roemeri (Pilsbry & Ferriss)
Retinella indentata paucilirata (Morelet)
Hawaiia minuscula (Binney)
Zonitoides arboreus (Say)
Discus cronkhitei (Newcomb)
Succinea sp.
Strobilops texasiana Pilsbry & Ferriss
Gastrocopta armifera (Say)
Gastrocopta clappi (Sterki)
Gastrocopta contracta (Say)
Gastrocopta procera sterkiana Pilsbry
Pupoides albilabris (C. B. Adams)
Pupilla blandi Morse
Vallonia gracilicosta Reinhardt
Vallonia perspectiva Sterki
Cionella lubrica f. exigua (Menke)
Helicina orbiculata tropica Pfeiffer

BANDERA County; loess, 1 mile east of Medina.

Polygyra mooreana (W. G. Binney)
Stenotrema leai aliciae (Pilsbry)
Praticolella berlandieriana (Moricand)
Bulimulus mooreanus (Pfeiffer)
Bulimulus dealbatus (Say)
Retinella roemeri (Pilsbry & Ferriss)
Retinella indentata paucilirata (Morelet)
Zonitoides arboreus (Say)
Discus cronkhitei (Newcomb)
Helicodiscus singleyanus (Pilsbry)
Succinea sp.
Strobilops texasiana Pilsbry & Ferriss
Gastrocopta armifera (Say)
Gastrocopta contracta (Say)
Gastrocopta procera sterkiana Pilsbry
Pupoides albilabris (C. B. Adams)
Cionella lubrica f. exigua (Menke)
Vallonia perspectiva Sterki
Helicina orbiculata tropica Pfeiffer

BANDERA County: loess, 3 miles west of Bandera.

Polygyra texasiana (Moricand)
Polygyra mooreana (W. G. Binney)
Bulimulus mooreanus (Pfeiffer)
Succinea sp.
Succinea sp.
Helicina orbiculata tropica Pfeiffer

McMULLEN County: loess, 18 miles south of Tilden.

Polygyra texasiana (Moricand)
Praticolella berlandieriana (Moricand)
Bulimulus alternatus (Say)
Bulimulus dealbatus (Say)
Helicina orbiculata tropica Pfeiffer

BROOKS COUNTY: silt, near Palo Blanco Creek, at Texas 285, 15 miles west of Falfurrias.

Polygyra texasiana (Moricand)
Stenotrema leai aliciae (Pilsbry)
Praticolella pachyloma (Menke)
Bulimulus alternatus (Say)
Bulimulus dealbatus (Say)
Retinella indentata paucilirata (Morelet)
Hawaiia minuscula (Binney)
Helicodiscus parallelus (Say)
Helicodiscus singleyanus (Pilsbry)
Strobilops texasiana Pilsbry & Ferriss
Gastrocopta contracta (Say)
Gastrocopta tappaniana (C. B. Adams)
Gastrocopta cristata (Pilsbry & Vanatta)
Gastrocopta riograndensis (Pilsbry & Vanatta)
Gastrocopta pellucida hordeacella (Pilsbry)
Pupoides albilabris (C. B. Adams)
Vallonia parvula Sterki
Helicina orbiculata tropica Pfeiffer

LAND SNAILS FROM THE LOESS IN THE VICINITY OF NEW HARMONY, POSEY COUNTY, INDIANA

LESLIE HUBRICHT

3235 -23rd Ave., Meridian, Mississippi

Charles Frieg Farm, 0.5 mile south of New Harmony. This is a natural exposure on the hillside above the road. It is the type locality for Pomatiopsis scalaris F. C. Baker and probably also for Hendersonia occulta (Say).

Stenotrema leai (Binney)
Stenotrema barbatum (Clapp)
Nesovitrea electrina (Gould)
Zonitoides arboreus (Say)
Anguispira alternata (Say)
Discus patulus (Deshayes)
Discus cronkhitei (Newcomb)
Helicodiscus parallelus (Say)
Helicodiscus shimeki Hubricht
Catinella gelida (F. C. Baker)
Strobilops labyrinthica (Say)
Gastrocopta armifera (Say)
Vallonia gracilicosta Reinhardt
Hendersonia occulta (Say)
Pomatiopsis scalaris F. C. Baker

Seven-tenths (0.7) mile south of New Harmony. This is a little south of the Frieg Farm locality. Here the top of the hill was removed for fill dirt, exposing a large area of loess.

Stenotrema barbatum (Clapp)
Stenotrema leai (Binney)
Stenotrema fraternum (Say)

Mesodon zaletus (Binney)
Triodopsis multilineata (Say)
Haplotrema concavum (Say)
Euconulus fulvus (Müller)
Nesovitrea binneyana (Morse)
Retinella indentata (Say)
Paravitrea capsella (Gould)
Zonitoides nitidus (Müller)
Zonitoides arboreus (Say)
Anguispira alternata (Say)
Anguispira kochi (Pfeiffer)
Discus patulus (Deshayes)
Discus cronkhitei (Newcomb)
Discus catskillensis (Pilsbry)
Helicodiscus parallelus (Say)
Helicodiscus shimeki Hubricht
Punctum minutissimum (Lea)
Catinella gelida (F. C. Baker)
Strobilops labyrinthica (Say)
Gastrocopta armifera (Say)
Vertigo hubrichti Pilsbry
Vertigo modesta (Say)
Columella edentula (Draparnaud)
Vallonia gracilicosta Reinhardt
Hendersonia occulta (Say)

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SOME DISTRIBUTION RECORDS FOR LOUISIANA, ARKANSAS, AND MISSOURI GASTROPODA

BRANLEY A. BRANSON

Kansas State College, Pittsburg, Kansas

There are great tracts of land in the United States which are conchological blanks as concerns the various species living there. It has been nearly 50 years since any comprehensive work has been published on the mollusks of Arkansas and Louisiana and Missouri needs to be thoroughly surveyed taxonomically and ecologically. Consequently, the following is offered as a simple list to be incorporated in the body of knowledge waiting to be gleaned from these areas.

LOUISIANA

All of the specimens reported from this state were collected by Dr. Walter Harman and/or his students.

Campeloma decisum Say. 8:IV: 1961; 3 live; Chatham Lake spillway, Jackson Parish.

Viviparus intertextus Say. 25:XI: 1954; 2 immature alive; Raceland, LaFourche Parish.

Lymnaea columella Say. 8:II:1961; 4 live; Harvey's Pond, Jonesboro, Jackson Parish.

Physa anatina Lea. Data as in L. columella; 14 dead shells.

Stenotrema leai aliciae (Pilsbry). 12:V:1959; 7 shells; 7 miles northwest of Dry Prong, Grant Parish.

Mesodon thyroidus (Say). Data as in Stenotrema; 2 live adults.

Mesodon inflectus (Say). Data as in Stenotrema; 2 live adults.

Triodopsis vultuosa cragini Call. Data as in Stenotrema; 2 live and 3 dead shells.

Euglandina rosea bullata (Gould). 20:X:1960; 1 dead; D'Arbonne Swamp, Union Parish.

Retinella indentata (Say). Data as in Stenotrema; 1 live.

Ventridens demissus (Binney). Data as in Stenotrema; 1 dead.

Zonitoides arboreus (Say). Data as in Stenotrema; 2 dead.

Anguispira alternata (Say). 8:VII: 1958; 4 live; 6 miles east of Sabine River bridge, State Highway 6; Sabine Parish; 1 live.

Succinea concordialis Gould. Data as in Stenotrema; 1 dead.

Strobilops labyrinthica (Say). Data as in Stenotrema; 2 live.

MISSOURI

All the following specimens were collected on 14:X:1961 at Saginaw, Jasper County.

Polygyra jacksoni (Bland). 6 live and 4 dead.

Polygyra deltoidea (Simpson). 2 dead.

Mesodon inflectus (Say). 1 dead.

Retinella indentata (Say). 2 live.

ARKANSAS

The specimens from the White River were secured by Dr. Kirk Strawn, University of Arkansas.

Helisoma anceps (Menke). 12:XI:1960; 2 live.

Oxytrema alveare (Conrad). Data as in Helisoma; 54 live, typical downstream forms.

Unless otherwise stated the following specimens were collected from the Cove Creek Area, State Highway 23, Franklin County, 12:IV:1961.

Mesodon zaletus (Binney). 2 live adults.

Mesodon perigraptus (Pilsbry). 6 live adults. This is near the western limits for this form.

Mesodon inflectus (Say). 3 live adults.

Mesodon magazinensis (Pilsbry and Ferriss). 3 live specimens. This species has not been collected since 1903.

Triodopsis albolabris (Say). 5 live adults; 4 live adults, 27:III:1959, two miles north of Cincinnatia, Washington County.

Stenotrema labrosum Bland. 3 live adults.

Retinella wheatleyi (Bland). 25:III: 1951, Clarkville; 1 dead.

Retinella indentata (Say). 2 live adults.

Mesomphix cupreus (Rafinesque). 4 live adults.

Paravitrea petrophila (Bland). Data as in R. wheatleyi; 1 dead shell.

Ventridens demissus brittsi (Pilsbry). 21:V:1958; 4 topotypes, South Mountain, Hot Springs National Park, Garland County.

Discus patulus (Deshayes). 52 live adults.

KEY REFERENCES TO THE MOLLUSCA OF ALABAMA

(Continued from page 4)

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REPRINTS OF RARE ARTICLES ON MOLLUSCA. -- D. H. BARNES, 1823, "On the Genera Unio and Alasmodonta; with Introductory Remarks." --- American Journal of Science, vol. 6, No. 2, pp. 258-280, pls. 1-8, 11-13.

Reprinted with permission of the Editor of the American Journal of Science, Dr. John Rodgers. -- The First part of this article appeared in STERKIANA No. 6, pp. 40-51, February, 1962.

NOTE. The original paper is accompanied by eleven plates which have been rearranged into six for this reprint because of the difference in format between the American Journal of Science and STERKIANA. Descriptions of the reprinted plates include indication of the figures on each original plate. The editor regrets that reproduction of the plates was imperfect due to the fact that plates in all available copies of the original paper had been trimmed in binding and were so tightly bound into the book that the left-hand margin of some figures is indistinct or cut off. The reproductions appear to be sufficiently clear, however, to give an idea of the look of the originals and to allow the reader to see what Barnes had in hand when he prepared his work.

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CONCHOLOGY

Art. - VIII. - On the Genera Unio and Alasmodonta; with Introductory Remarks: by D. H. Barnes, M. A. Member of the New-York Lyceum of Natural History. °

(Concluded from pa. 127.)

UNIO

°° Cardinal teeth moderately thick, direct.

OBSERVATIONS

The shells of this section are, in general, not very thick. They have the beaks slightly elevated, or nearly flat. The

(°Read before the Lyceum.)

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external surface is neither waved nor tuberculated. The teeth are less sulcated than those of the former, and only crenulated, or striated, generally triangular and elevated, and, in magnitude, bear a proportion to the thickness of the shell. The cavity of the beaks is small, or none, and neither angular nor compressed. The shells have a smooth and regular appearance, and five of the seven species have the inside purple.

SPECIES

10. UNIO ELLIPTICUS. Fig. 19. { a. outline b. of c. four d. sizes

Shell regularly oval, thick, convex, glabrous, beaks depressed. Teeth elevated, triangular, striated.

Unio Crassus. Mr. Say. Plate 1 fig. 8?
Mya Complanata? Dillwyn. page 51.

Inhabits Fox River. Mr. Schoolcraft.
Dr. Mitchill's Cabinet.
My Collection.

Diam. 1.0 - 2.0 Length 1.7 - 3.2 Breadth 2.5 - 4.9 inches. Shell long before, and short behind, equally rounded at both extremities; beaks nearly flat; ligament elevated above the beaks; epidermis yellowish brown, obscurely rayed, rays disappearing in old specimens; slightly flattened on the anterior slope; teeth deeply divided, elevated, finely striated; anterior cicatrix wrinkled; posterior rough; cavity of the beaks considerable. Naker pearly white, iridescent, and sometimes, of a beautiful flesh colour.

11. UNIO CARINATUS. Fig. 10 {a. inside. b. outside.

Shell oblong oval, biangulate before, rayed, hinge margin straight, compressed, keel-shaped, teeth finely striate.

Inhabits Fox River. Mr. Schoolcraft.
Dr. Mitchill's Cabinet.
My Collection.

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Diam. .7 - 1.3 Length 1.2 - 2.3 Breadth 2.1 - 3.7 inches.

Shell transversely elongated, sub-pentangular, moderately thick, rounded behind; beaks slightly elevated, approximate; hinge margin straight, elevated, compressed, keel-shaped, longitudinally furrowed, fuscous with submembranaceous striae; anterior dorsal margin straight and subtruncate; basal margin rounded; epidermis greenish yellow, with broad dark green rays; surface glabrous. Cardinal teeth slightly striated, nearly smooth; posterior cicatrix deep and striated; naker very white, iridescent.

Variety (a) obscurely rayed, more convex, compressed on the base, and gaping behind.

Inhabits Lake Champlain.
My Collection.

REMARKS. -- This is a beautiful species. It cannot be confounded with any of the varieties of the Cariosus or Radiatus, on account of the primary teeth, which are entirely different. We have so many specimens of this shell, and they are all so perfectly characterized, and so much alike, that there can be no doubt of its being entitled to a distinct appellation. In several of the specimens, the epidermis is worn off, exhibiting a flesh-coloured substance beneath.

12. UNIO ALATUS. -- Shell ovately triangular; hinge margin elevated into a large wing; valves growing together on the back of the ligament, inside purple.

Unio Alatus. Mr. Say.
Unio Alata. M. Lamarck.
American Conchology, plate 4. fig. 2.
Inhabits Fox River. Mr. Schoolcraft.
Wisconsan. Capt. Douglass.
Cabinets of the Lyceum and Dr. Mitchill.

We have every size of this shell from one inch to six inches and nine tenths broad. A full grown specimen measures as follows, viz.

Diam. 2.0 Length 4.7 Breadth 6.9

A middle aged and very splendid specimen measures D. 1.6 L. 4.0 B. 6.0

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Shell moderately thick; disks flat and compressed, long before and short behind; beaks depressed; ligament concealed within the valves; hinge margin very much elevated and compressed; basal margin nearly straight; anterior dorsal margin incurved or emarginate; anterior margin rounded and broad; posterior margin rounded and narrow; surface deeply wrinkled. Teeth elevated and crenate; anterior cicatrix very broad; posterior composed of three distinct impressions, two small ones before the large one, and also a row of very small impressions across the cavity of the beaks, before the cardinal tooth. Naker red-purple and very brilliant; cavity of the beaks small and indented with from six to ten minute impressions in a row nearly longitudinal.

REMARKS. -- The hinge margin is less elevated, and the colour less brilliant, in old than in young and middle aged specimens. The former approach the regular oval form, the latter are broad ovate.

None of the specimens in our collections

exhibit the character mentioned by Mr. Say, viz. "the external laminated tooth obsolete, only one in each valve being perceptible;" and the tubercles, mentioned by him on the inside, appear only in very old specimens.

M. Le Sueur thinks that the remarkable union of the valves above the ligament ought to characterize a distinct genus. This union can seldom be observed in Cabinet specimens, as the part is very fragile. Of the numerous specimens in our collections, one only retails the full elevation of the wing; the rest having been broken in transportation. This is the most splendid species of the Unio yet known, and it is so remarkably characterized as readily to be distinguished from all others, except perhaps the Unio Gracilis; which, though perfectly distinct, might, at first view, be mistaken for the young of this species.

13. UNIO PRAELONGUS. Fig. 11. {outline of three sizes.

Shell much elongated transversely, narrow, thick, tumid, beaks flat; lateral tooth long, thin; inside purple.

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Unio purpurata? M. Lamarck.
Inhabits Fox River. Mr. Schoolcraft.
Wisconsan. Capt. Douglass.
Cabinets of the Lyceum and Dr. Mitchill.
My Collection.

Diam. 1.7 - 2.1 Length 2.5 - 2.7 Breadth 5.8 - 6.4

Shell very long oval; anterior side somewhat pointed, posterior side short, rounded, obtuse; beaks depressed; ligament elevated above the beaks; basal margin slightly compressed, shortened, or, in old specimens, arcuated; in young rounded; epidermis blackish brown, with fine interrupted wrinkles placed in longitudinal rows, having somewhat the appearance of striae. Young specimens are rayed with yellowish olive, and have the epidermis smooth and glabrous. Naker purple of different shades according to the age or perfection of the specimen, sometimes tinged with irregular spots of greenish, particularly under the beaks, with a row of small muscular impressions in the cavity.

REMARKS. -- This shell is probably the Unio purpurata of M. Lamarck. (See introductory remarks.) We have every size from the breadth of one inch, to six inches and four lines.

Variety (a) Shell on the inside striated longitudinally. Naker red-purple, very splendid.

Variety (b) Naker whitish green on the margin, and purple in the centre. An uncommonly beautiful shell, tinged with copper?

My Collection.

14. UNIO GIBBOSUS. Fig. 12. {a. inside, b. outside.

Shell elongated transversely, thick, gibbous; lateral tooth very thick, incurved, inside purple.

Inhabits Wisconsan. Mr. Schoolcraft.
My collection. Lyceum's Cabinet.
Mr. Say's Collection. Philadelphia.

Diam. .75-1.3 Length 1.15-1.9 Breadth 24-4.0

Shell much elongated transversely, thick and heavy, rapidly narrowed and rostrate before, narrow and rounded be-

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hind, sub-cylindrical, disks somewhat compressed; anterior side very much produced; beaks flat; ligament elevated; anterior dorsal margin depressed and flattened; basal margin nearly straight; epidermis blackish brown, finely striated and deeply wrinkled transversely; naker purple of different shades, often with a purple centre and white margin. Teeth crenate; lateral tooth rough, very thick, bending downward, terminating abruptly and folded over towards the interior of the shell.

REMARKS. -- This shell in many respects resembles the preceding, but it differs from it in being less, thicker in proportion to the size, more attenuated before; and it may be distinguished from all others by the unusual thickness of the lateral tooth. It is also more depressed immediately behind the beaks, and the thickness of the anterior part of the shell is very unusual, being in some specimens greater than that of the posterior. In one specimen the lateral tooth of the left valve measures two lines in thickness, and the channel of the opposite valve is two and a half lines broad.

15. UNIO CUNEATUS. -- Shell ovate, wedge-shaped, thick, gibbous; disks swelled, anterior lunule furrowed; lateral tooth thin; inside purple.

Inhabits the Ohio. Mr. S. B. Collins.
Mr. Collins's collection.
Diam. 1.6 Length 2.3 Breadth 3.8

Shell elongated and sub-triangular, thick and ponderous; anterior side narrowed, thin, angulated, wedge-shaped, compressed; umbones large and somewhat elevated; beaks low and distant; anterior lunule long-heart-shaped, large, distinct with an elevated ridge and longitudinally furrowed; posterior lunule small and deep; basal margin slightly rounded; anterior margin narrow and angulated; anterior dorsal, rapidly narrowed; posterior dorsal impressed; epidermis blackish brown, somewhat ferruginous; surface finely wrinkled, an elevated ridge extends from the beaks to the anterior basal margin, and terminates in an angle on the fore part. Cardinal teeth deeply divided and sulcated; lateral tooth long, curved, and not very thick; cicatrices deep; cavity of the beaks small and not angular; naker brownish purple, iridescent.

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REMARKS. -- This shell differs from the foregoing one, in its outline, in its greater length, less breadth, and in being more triangular. In that the lunules are not distinct; in this they are strongly marked. The lateral teeth of the two differ in length, thickness, direction and surface. This shell, if the thickness only were observed, might be mistaken for a variety of the Crassus; but the teeth are totally different.

16. UNIO PURPUREUS. -- Shell not very thick, obliquely sub-truncate before; beaks depressed; epidermis without rays, glossy;

Unio Purpureus. Mr. Say.
Unio Purpurascens. M. Lamarck.
Unio Rarisulcata ?, Unio Coarctata ? } M. Lamarck.

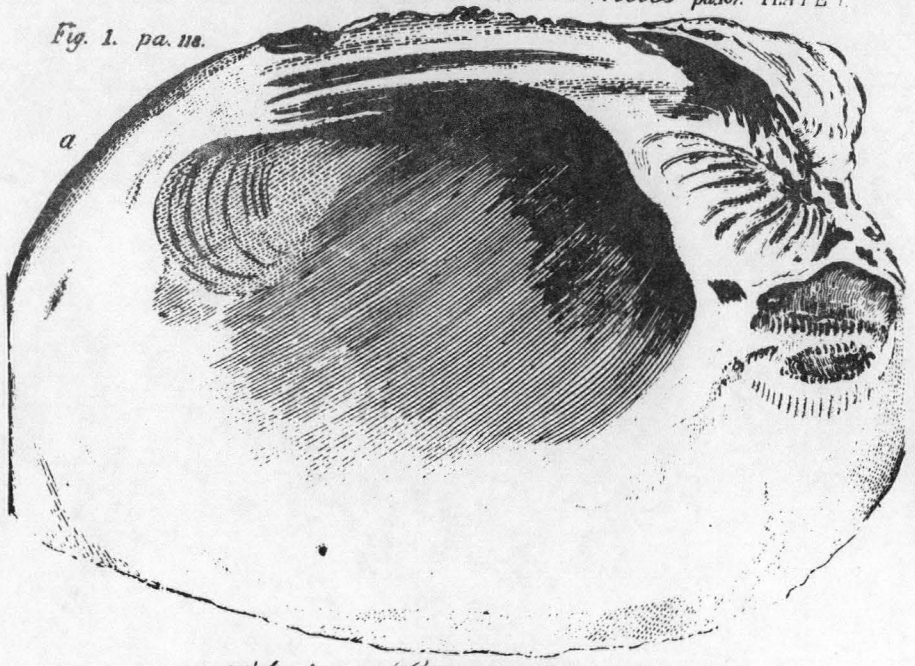
EXPLANATION OF PLATE 1, OPPOSITE PAGE

Unio Crassus (two left-hand figures). Page 118 of original text.
Plate 1, Figs. 1a and b of original. The figures have been cut off slightly because of tight binding of the plate copied.

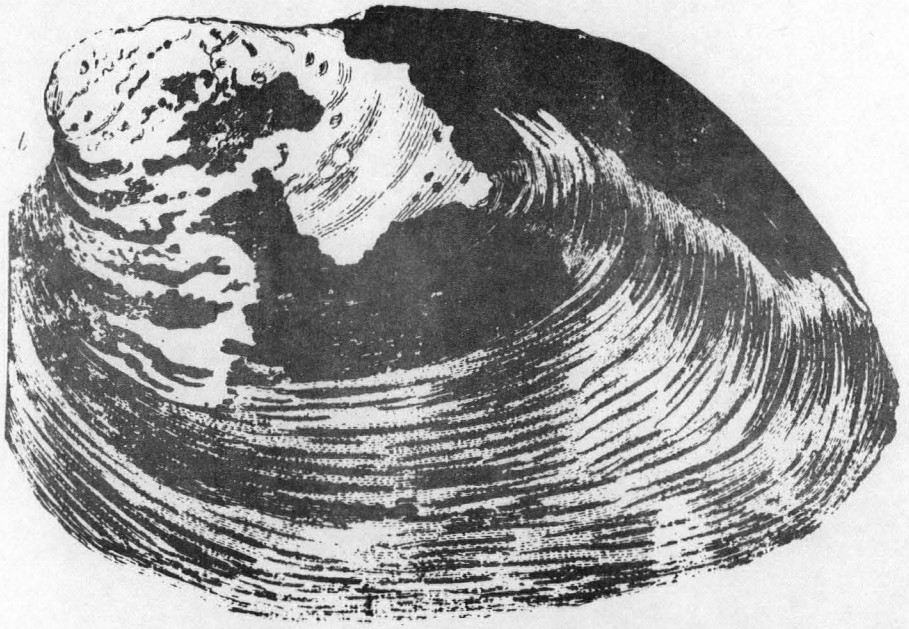
Unio Undulatus (two right-hand figures). Page 120 of original text.
Plate 2, Figs. 2a and b of original. The figures have been cut off slightly because of tight binding of the plate copied.

Mr. Barnes on Shells pa.107. PLATE I.

Fig. 1. pa. 118.

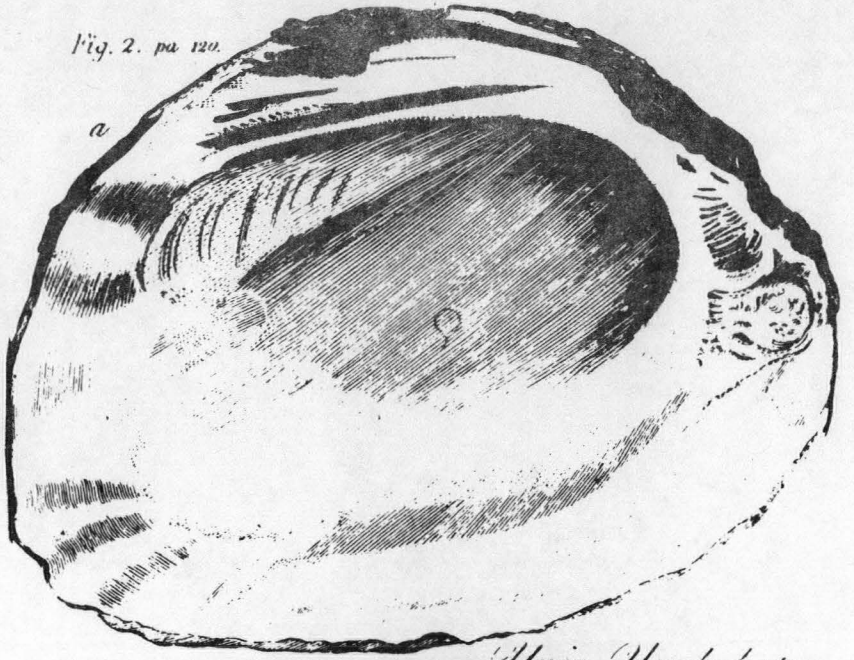


Unio Crassus



Mr. Barnes on Shells pa.107

Fig. 2. pa. 120.



Unio Undulatus.

PLATE I

Unio Rhombula?
Unio Carinifera? } M. Lamarck.
Unio Georgiana?

American Conchology, Plate 3, Fig. 1.

Inhabits Lakes and Rivers eastward of the Alleghany mountains.

Cabinet of the Lyceum. My collection.

The varieties, which are exceedingly numerous, differ very much from each other in the length of the diameter, some measuring 13 lines, and some only 5. The length and breadth are generally in the proportions of 3 to 5. Mr. Say's figure measures length 1.4, breadth 2.6, and many specimens are twice as broad as they are long.

Diameter 1.3. Length 2.5. Breadth 4.5.

Inhabits Stony Creek, near Princeton, N. J. Mr. Sears.

1.1 1.8 3.45

Inhabits the Kayaderosseras.

.75 1.5 3.0

Inhabits the Housatonick.

Shell sub-oval, ovate-oblong, ovate - rhomboidal, oblong-ovate; thin, or not very thick; disks convex, convex-depressed, or somewhat compressed; before somewhat angulated or rounded,obliquely; base rounded, straight, a little shortened, depressed, sub-sinuate, or coarctate-sinuate; beaks not prominent; hinge margin elevated, compressed,

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carinate or depressed; epidermis has generally a silky lustre; surface with smaller wrinkles placed between larger ones, or with transverse elevated distant furrows, or smooth; cardinal teeth small, or not very large, sulcated or striated; naker livid, cerulean, green, purple, red, violet, white, with various shades and mixtures of these colors; no cavity under the beaks.

REMARKS. -- The terms of the foregoing description are taken from Mr. Say's and from the six species of M. Lamarck mentioned above. This is a very common shell, of a regular and uniform appearance, without prominence of parts, or strongly marked characters; which perhaps induced M. Lamarck to say "it is nothing remarkable." ° Amidst a variety almost infinite, like that of the human countenance, there is still a characteristic identity of this species, which can scarcely be mistaken by an experienced observer. One variety of the Radiatus from the Saratoga Lake approaches nearest to this species, but the least appearance of rays forbids this association.

°°° Cardinal teeth small, direct.

17. UNIO RADIATUS. -- Shell broad-ovate, thin, finely striated, glossy rayed, within bluish white, or tinged with red.

Unio Ochraceous. Mr. Say.
Mya Radiata. Mr. Dillwyn.
Unio Radiata. M. Lamarck.
American Conchology, plate 2, fig. 8.

Inhabits lakes and rivers of North-America.

Cabinet of the Lyceum. My collection.

Diam. .6-.9 Length 1.2-1.5 Breadth 2.0-2.5.

Shell with the anterior side broad, thin and fragile, disks in old specimens somewhat convex; in youug, depressed; beaks slightly elevated and approximate; ligament elevated; hinge margin elevated, compressed, carinate; basal margin commonly a little depressed, and sometimes arcuated; anterior margin narrow; posterior broad; anterior dorsal sub-truncate; epidermis greenish yellow or olive-brown, rayed with dark green, and very finely striated trans

(page 266)

versely; surface smooth and shining. Cardinal teeth crenulated, cavity of the beaks small; naker bluish white, or reddish yellow; surface smooth and pearly.

Variety (a) very obscurely rayed and much like Unio Purpureus in shape.

Inhabits Saratoga Lake.

Variety (b) oval or very nearly as broad behind as before.

Inhabits the Wisconsan. Capt. Douglas.

° See An. Sans Vertebres, Vol. VI, p. 74, U. Georgina.

18. UNIO MUCRONATUS. Fig. 13. { outline of the shell

Shell ovate, broader behind; base compressed, falcated; beaks small, elevated, acute, inside purple.

Inhabits the Wisconsan. Capt. Douglass.

My Collection.

Diam. .7 Length 1.3 Breadth 2.3

Shell ovate, moderately thick, produced, narrowed, and compressed before; rounded and broad behind; disks compressed; anterior lunule long, distinct, with a marginal furrow; posterior lunule small, deeply impressed; hinge margin rounded; basal margin arcuated; anterior dorsal rapidly narrowed and slightly emarginate; epidermis horn-color, and obscurely rayed; surface smooth; cardinal teeth serrate sulcate; cicatrices deep; naker purplish on the margin, and whitish in the centre.

REMARKS. -- This species has somewhat the outline of the Unio Tuberculatus, but the outside is smooth. The individual above described is probably not more than half grown, as the umbones are very little eroded.

19. UNIO INFLATUS. -- Shell oval, thick, tumid, beaks broad, obtuse behind, wedge-shaped before, inside pearly white.

Inhabits the Wisconsan and Lake Erie. Capt. Douglass.

Dr. Mitchill's Cabinet.

My collection.

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Diam. 1.4 Length 1.7 Breadth 3.2.

Shell about equally broad before and behind, thick and very much swelled, the diameter being almost equal to the length; beaks broad round and somewhat elevated; posterior side very short and obtuse; anterior side wedge-shaped produced. Hinge margin nearly straight, and parallel to the base; basal margin straight and slightly compressed in the middle; epidermis yellowish-green, rayed; surface wrinkled and striated transversely; cardinal teeth elevated, pointed, sulcated; lateral teeth papillous; posterior cicatrix deep, and somewhat rayed with elevated lines; cavity of the beaks moderate; naker pearly white and iridescent; internal surface papillous.

REMARKS. -- This shell is less than the Unio Siliquoideus, and also more rounded and gibbous, shorter behind and proportionally longer before than that species. The varieties of the two species approach each other, and are to be distinguished only by the teeth.

B. TEETH OBLIQUE.

**** Cardinal teeth, broad, oblique, compressed.

20. UNIO VENTRICOSUS. Fig. 14. { a small size. b large size. c the first variety.

Shell large thick triangularly ovate, convex; umbones large, round, prominent; beaks recurved; cavity capacious.

Mya Radiata. Dillwyn's Letter to Dr. Mitchill.

Unio Cariosus. Mr. Say's Letter to the Author.

Inhabits the Wisconsan. Mr. Schoolcraft.

EXPLANATION OF PLATE 2, OPPOSITE PAGE

Unio Plicatus (top left-hand figures). Page 120 of original text.
Plate 3, Figs. 3a and b of original.

UNIO Undatus (top central two figures). Page 121 of original text.
Plate 4, Figs. 4a and b of original.

Unio Cornutus (top right-hand three figures). Page 122 of original text.
Plate 4, Figs. 5a, b, c, of original.

Unio Verrucosus (bottom two figures). Page 123 of original text.
Plate 5, Fig. 6 of original.

PLATE 2

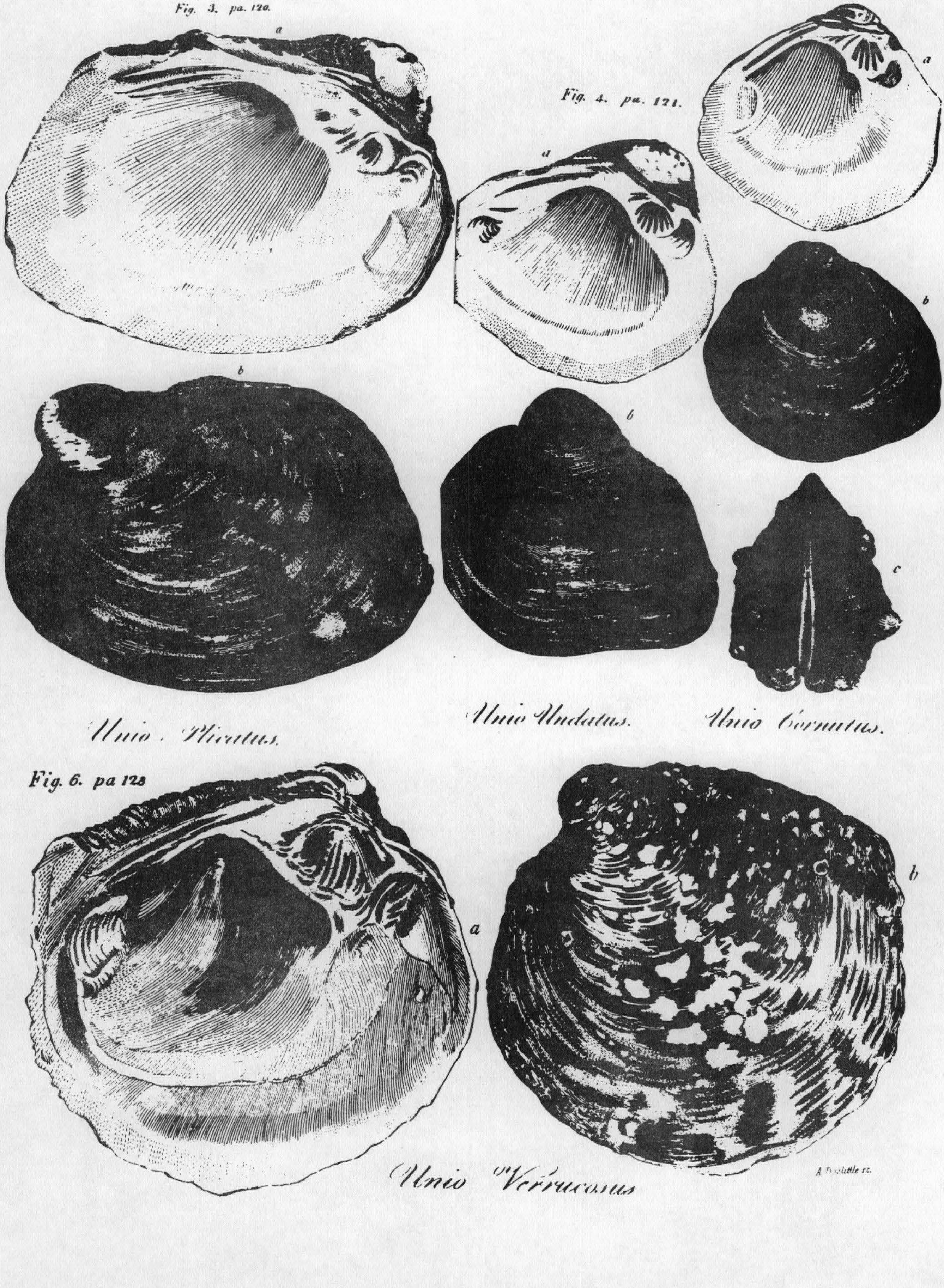

Fig. 3. pa. 120. — *Unio Plicatus.*

Fig. 4. pa. 121. — *Unio Undatus.*

Fig. 5. — *Unio Cornutus.*

Fig. 6. pa 123 — *Unio Verrucosus*

A. Doolittle sc.

Mississippi, near Prairie du Chien.
Capt. Douglass.
Cabinets of the Lyceum and Dr. Mitchill. My Collection. Mr. Say's Collection, Philadelphia.
Diam. 2.5 Length 3.5 Breadth 4.5.
Shell with the anterior side very broad, subtruncate; posterior side rapidly narrowed, subangulated; disks very convex; umbones large, round, elevated; beaks recurved

(page 268)

over the ligament; ligament large and prominent, passing under the beaks; anterior lunule depressed at the margin, fuscous, broad-heart-shaped, longitudinally waved; hinge margin depressed between the beaks; posterior slope carinate; epidermis yellowish olive, becoming chestnut brown on the umbones; rayed with green, more conspicuous in young specimens; in old ones the dark chestnut brown covers the whole and conceals the rays; surface smooth and shining, reflecting the face of the observer; young shells are splendent, having a much stronger lustre on the outside than on the inside; cardinal teeth broad, prominent and obliquely flattened; lateral teeth broad, elevated and terminating abruptly before; cicatrices large; cavity of the beaks unusually large; naker pearly white; surface smooth, but not highly polished.

REMARKS.-- There is a remarkable uniformity in the dimensions of the full-grown specimens of this species. This shell is more capacious than any other of the genus hitherto described. It most resembles the unio ovatus, but its greater capacity, darker color, its smooth, shining and rayed surface will distinguish it without mistake.

Variety (a) shell broader, less ovate, nearly oval and rounded on both sides.
A fine large shell. It measures
Diam. 2.3-2.8 Length 3.1-3.8 Breadth 4.1-5.4.
Inhabits the Wisconsan. Mr. Schoolcraft.
Variety (b) shell with the teeth slightly elevated; cardinal one formed by a serrated edge of the shell, and a slight projection within.
Inhabits Barbadoes Neck, N.J. near New-York.
Mr. Bradhurst's Collection.
Diam. 2.5 Length 3.5 Breadth 4.8.
Variety (d) a shell from the Delaware approaches this species. The form and colour are similar. It is however less, the largest measuring scarcely 2.3 inches broad; making the shell not more than one fifth the size of those described above; also the beaks and bosses are less promi-

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nent, the rays fewer, and the polish less brilliant. It approaches the Unio Cariosus.
Inhabits the Delaware at New Hope. Mr. J. Sears.
My Collection.

REMARKS.-- With the most respectful deference to the two distinguished Naturalists whose names are mentioned above, I have ventured to differ from them both, as they do from each other. I think a slight examination of our Cabinets would convince either of them that this shell requires a separate designation. Two bivalves can scarcely be more unlike than this and the Unio Radiata of Lamarck; and the recent discovery, of the variety C, in our own waters, which produce thousands of the Unio Cariosus, seems conclusive as to that. This variety it will be observed has precisely the same diameter and length as the shell from the Wisconsan, and the difference in the teeth may be accidental. There is the same necessity for distinguishing these as any others. They are totally unlike.

21. Unio SILIQUOIDEUS. Fig. 15. { outline of the shell.

Shell long-ovate, sub-cylindrical, thick, regularly rounded, rayed, beaks slightly elevated, cavity small; inside white.

Inhabits the Wisconsan. Capt. Douglass.
Dr. Mitchill's Cabinet. My Collection.
Diam. 1.3-1.6 Length 1.8-2.1 Breadth 3.3-3.8.
Shell elongated transversely, disks swelled;

beaks about one fourth from the posterior extremity; hinge margin straight; basal margin convex depressed; anterior margin rounded; posterior sub-angulated; epidermis yellowish olive rayed with distant dark green narrow lines; surface deeply wrinkled, and somewhat imbricated; striae dark and lamellar on the anterior slope; smooth and bright on the centre of the disks; cardinal teeth elevated crest-like compressed, and very oblique; in some specimens nearly parallel to the edge of the shell; lateral teeth long and

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straight; cavity of the beaks small and rather shallow, naker pearly white and iridescent, surface smooth and polished.

Variety (a) shell less, more ovate, broader before, hinge margin more elevated.

REMARKS. -- This is a beautiful and elegantly formed shell. It somewhat resembles a pea-pod; hence its name. It agrees in color and surface with the Unio Ventricosus, but differs in being of smaller size, longer in proportion, more cylindrical, less inflated, beaks much less elevated, and cavity less capacious.

22. UNIO OVATUS. -- Shell roundish-ovate, convex, umbones elevated, beaks recurved, anterior lunule flattened; teeth crest-like elevated.

Unio Ovatus. Mr. Say.
Unio Ovata. M. Lamarck.
Inhabits the Ohio. Mr. Collins.
Maumee, at Fort Wayne. Mr. Sears.
Mr. Collins' Collection. My Collection.
Diam. 1.6-2.0 Length 2.3-3.0 Breadth 3.3-4.0.
American Conchology, plate 2, fig. 7.

Shell usually broader before, and narrower behind the beaks; but in the figure referred to above, the contrary is observed; thin when young, and not remarkably thick when old; disks swelled; umbones prominent; ligament partly concealed;

EXPLANATION OF PLATE 3, OPPOSITE PAGE

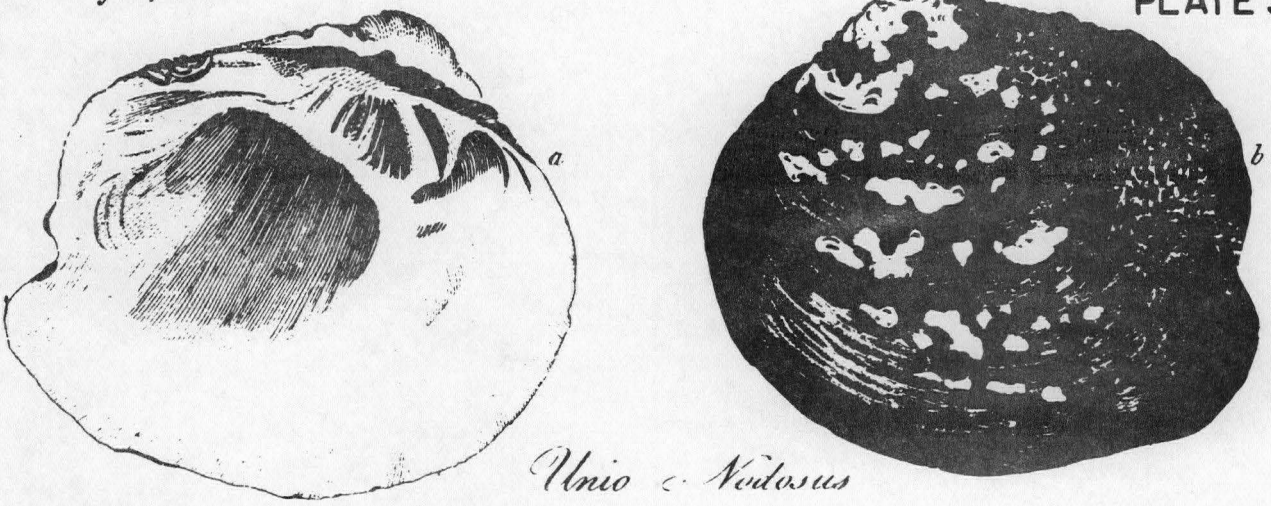
Unio Nodosus (two upper figures). Page 124 of original text.
Plate 6, Figs. 7a, b, of original.

Unio Tuberculatus (two lower left-hand figures). Page 125 of original text.
Plate 7, Figs. 8a, b of original.

Unio Rugosus (two lower right-hand figures). Page 126 of original text.
Plate 8, Figs. 9a, b of original.

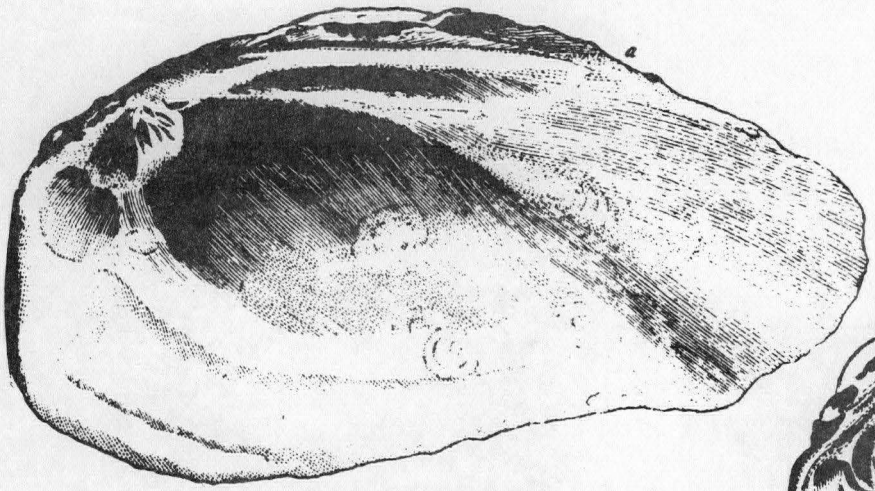
PLATE 3

Fig. 7. pa. 124.



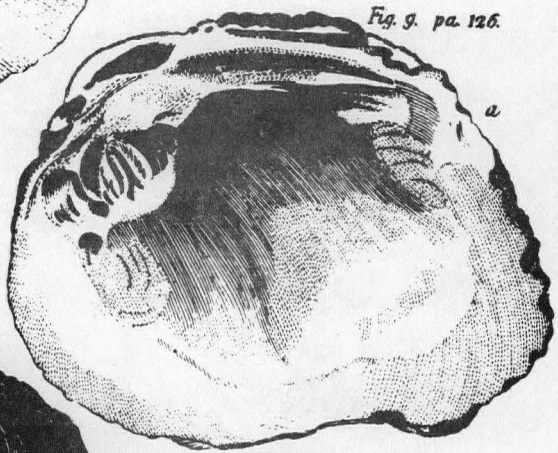
Unio Nodosus

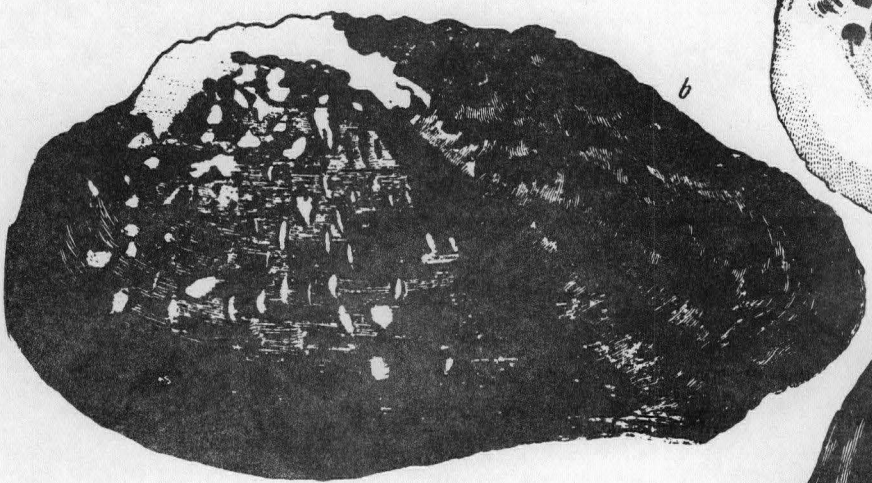
Fig. 8. pa. 125.

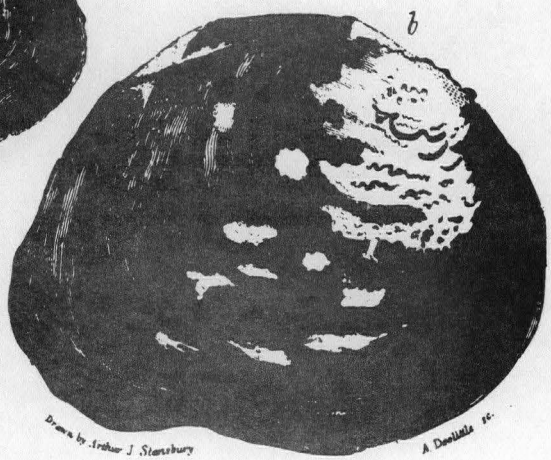


Unio Rugosus

Fig. 9. pa. 126.







Unio Tuberculatus

Drawn by Arthur J. Stansbury

Drawn by Arthur J. Stansbury

A. Doolittle sc.

anterior lunule flattened, and fuscous, somewhat waved with striae and wrinkles becoming lamellar; hinge margin making an angle with the anterior and posterior dorsal; epidermis yellowish, or horn color; surface glabrous, deeply wrinkled, wrinkles appearing on the inside; cardinal teeth crest-like, elevated and compressed; lateral teeth elevated; in some specimens, short, crooked, and apparently deformed; in others, straight; cicatrices smooth and polished; cavity large and rendered somewhat angular by the flattening of the anterior slope; naker pearly, bluish white; surface, in old specimens, papillous, in young, smooth.

REMARKS. -- The angular appearance produced by the flattening of the anterior slope, readily distinguishes this

(page 271)

species. It most resembles the Unio Ventricosus; but is less, thinner, "more flattened and even slightly concave on the anterior slope, from the oblique carina to the angle at the termination of the ligament." Mr. Say says the Ovatus is not rayed, and our specimens accord with his description, but M. Lamarck mentions a variety with rays from Lake George.

23. UNIO CARIOSUS. -- Shell ovate or oval, inflated, not very thick, beaks somewhat prominent, cavity moderate.

Unio Cariosus. Mr. Say.
Unio Cariosa. M. Lamarck.
Inhabits Lakes and Rivers of N. America.
My collection.
Diam. 1.6, Length 2.3, Breadth 3.7.
American Conchology, plate 3, fig. 2.

The dimensions and description of this shell vary so much that it is difficult to find a sufficient number of permanent characters by which it may be distinguished. It resembles in this respect the Unio Purpureus; for of the twelve characters mentioned by Mr. Say, and the six mentioned by M. Lamarck only four can be considered as in any degree permanent; and of these M. Lamarck has mentioned but one, and that is "inflated." The colour, form and size of the shell constantly vary. It is commonly broader before, but often equally broad at both extremities; and somewhat pointed. It is never very thick; often very thin; commonly a medium. Those from the Hudson are thin and small, from the Raritan thicker and broad; from the western waters middle sized and of considerable thickness; disks swelled, umbones elevated; ligament exterior and elevated; epidermis olive-brown or greenish, and commonly radiated. Internal colour bluish white, reddish, rose, or salmon; surface often warty.

Variety (a) Cardinal teeth multipartite.
Inhabits Lake Ontario.
Mr. Bradhurst's Collection.

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24. UNIO PLANUS. Fig. 16. outline of the shell.

Shell rhombick-oval, thin, beaks depressed; disks flattened, compressed; teeth slightly elevated, smooth.

Inhabits the Wisconsan. Mr. Schoolcraft.
My Collection.
Diam. 1.3 Length 2.8 Breadth 4.8.

Shell with the beaks flat, ligament broad and deeply inserted between the valves; hinge margin straight and parallel to the base; basal margin slightly arcuated; anterior dorsal margin subtruncate; epidermis brownish yellow; surface deeply wrinkled; cardinal teeth smooth, polished and slightly elevated; lateral teeth long and slender; cicatrices rough; cavity very small; naker bluish white tinged with purple and green. Internal surface wavy and tuberculated.

REMARKS. -- The flatness of the shell and the smoothness of the teeth, readily distinguish this species from all its congeners hitherto described. It has been supposed to be the Unio Anodontina of M. Lamarck; but besides being four times as large, it has not at all the general habit of an Anodonta; whereas M. Lamarck observes that his shell "might be mistaken for an anodonta unless it should be carefully observed."

*****Cardinal teeth small, oblique.

25. UNIO TRIANGULARIS. Fig. 17. { a inside. b outside.

Shell triangular, gibbous inflated, rayed, gaping; anterior slope flattened, ribbed, cancellate; inside white.

Inhabits Bois-blanc Isle, Detroit River.
Major Delafield.
Dr. Mitchill's Cabinet.
Major Delafield's Collection.
My collection.

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Of this remarkable shell we have four specimens;

Diam. .6	Length .625	Breadth 1.05	inch.
.625	.7	1.1	
.75	.8	1.5	
.8	.8	1.3	

Shell moderately thick, acutely angulated before obtuse and somewhat angulated behind; disks inflated; anterior slope flattened and forming a right angle with the disk, ribbed longitudinally and wrinkled transversely; beaks one third from the posterior extremity, decorticated approximate and somewhat elevated; anterior lunule oval-heart-shaped; posterior lunule not distinct; basal margin a little depressed near the anterior extremity; anterior margin straight, and its edge not entire; epidermis yellowish-green, rayed with dark green, finely striated transversely, and with from three to six more conspicuous transverse wrinkles. Anterior slope marked with longitudinal ribs which are beautifully cancellated by the striae and wrinkles passing over them, ribs projecting and forming a dentated edge; shell slightly gaping at both extremities; cardinal teeth two in each valve, compressed and crenulate, lamellar teeth short, projecting, finely crenulate, and terminating abruptly; naker bluish white iridescent.

REMARK. -- This shell resembles, in shape, the Alasmodonta marginata, but is a well characterized Unio.

26. UNIO NASUTUS. -- Shell oblong-lanceolate, thin produced and pointed before, hinge margin elevated, compressed, carinate.

Unio Nasutus, Mr. Say.
American Conchology, plate 4, fig. 1.

EXPLANATION OF PLATE 4, OPPOSITE PAGE

Unio Gibbosus, (upper left-hand figure). Page 262 of original text.
Plate 11, Fig. 12 of original.

Unio Carinatus (lower left-hand figure). Page 259 of original text.
Plate 11, Fig. 10 of original.

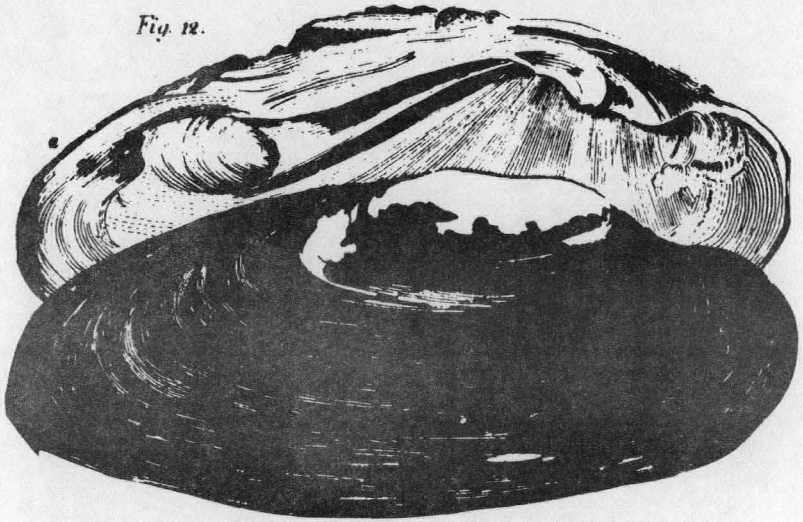
Alasmodonta Arcuata (young) (upper right-hand figure). Page 277 of original text.
Plate 12, Fig. 20 of original.

Alasmodonta Arcuata (old) (lower right-hand figure). Page 277 of original text.
Plate 12, Fig. 20 of original.

Wr. Barnes on Shells

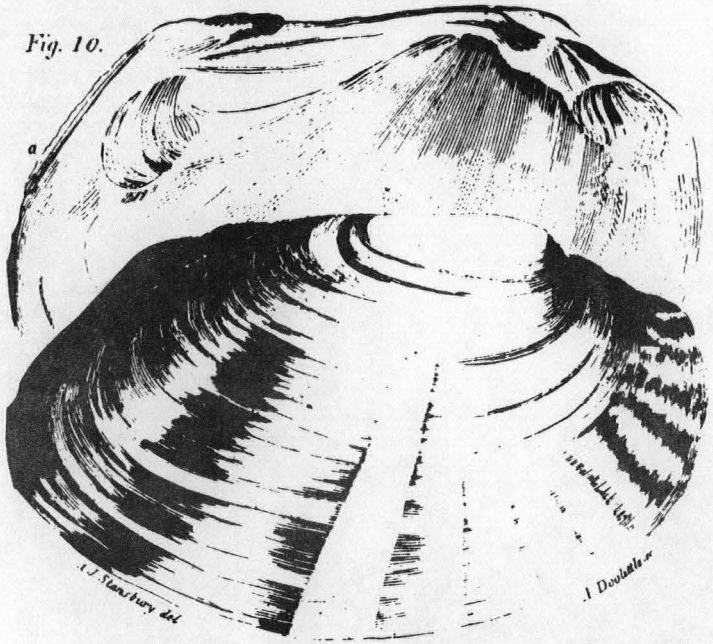
PLATE 11.

Fig. 12.



Unio Gibbosus.

Fig. 10.

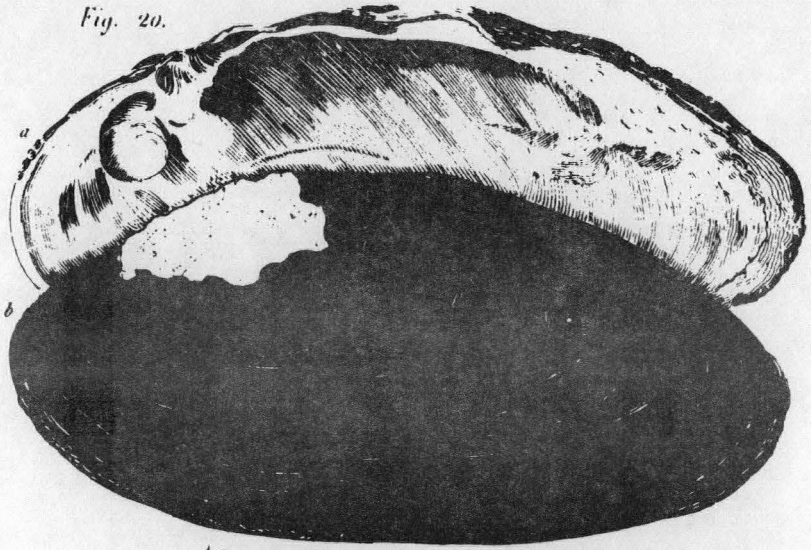


Unio Carinatus

Wr. Barnes on Shells.

PLATE 12

Fig. 20.



Masmodonta Truncata (young)

Fig. 20.

Masmodonta Arcuata (old)

PLATE 4

Inhabits the Delaware.
My Collection.
Diam. .5 Length 1.0 Breadth 2.2

Shell thin and slender; disks compressed; beaks depressed; ligament elevated and slender; anterior lunule distinct, somewhat depressed at the margin, and with obsolete longitudinal ribs; hinge margin straight; basal margin nearly parallel with the hinge, slightly divergent; anterior

(page 274)

extremity pointed, posterior rounded; epidermis greenish brown; surface striated, glabrous; cardinal teeth slender; lateral tooth long and thin; naker bluish-white varied with wax-yellow, and sometimes tinged with violet, and iridescent; cavity of the beaks, scarcely any.

REMARK. -- This cannot as M. Lamarck supposed be his Unio Nasuta, for it has no sinuses on the basal margin, is not "crooked" nor "obliquely attenuated."

27. UNIO GRACILIS. -- Shell ovately triangular, very thin and fragile, hinge margin elevated; valves connate; ligament concealed.

Unio Alatus. Mr. Say.
Inhabits the Wisconsan. Mr. Schoolcraft.
And the Lakes. Mr. Say.
Cabinet of the Lyceum.
My Collection.
Diam. 1.0-1.2 Length 2.2-2.5 Breadth 3.1-4.1.

Beaks depressed, and placed far back; ligament between the valves, and covered; anterior lunule distinct and obsoletely ribbed; hinge margin elevated into a large wing; epidermis sea-green, wrinkled and striated transversely; obscurely radiate and glabrous; cardinal teeth very small, scarcely projecting; lateral teeth very thin and finely striated; channel just sufficient to admit the point of the thumb nail; naker bluish-white tinged with violet, and beautifully iridescent.

REMARKS. -- This shell differs from Unio Alatus in being much thinner, broader in proportion, lighter color both inside and outside, produced and somewhat pointed behind; anterior slope in a straight line with the alated projection. It differs entirely in the shape and proportion of the teeth.

28. UNIO PARVUS. Fig. 18. } outline of the shell.

Shell oblong-ovate, small, convex, sides rounded; beaks slightly elevated, inside pearly white, iridescent.

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Inhabits the Fox River. Mr. Schoolcraft.
Cabinet of the Lyceum.
Mr. Collins's Collection.
Mr. Say's Collection, Philadelphia.
Diam. .35-.525 Length .4-.6 Breadth .75-1.2

Shell rather thin, beaks placed about one fourth of the length from the posterior extremity, ligament very narrow, anterior lunule distinct and obsoletely ribbed; basal margin slightly shortened; epidermis brownish; an obtuse slightly elevated rib from the beaks to the anterior basal margin; lateral tooth rectilinear rounded at the end, and parallel to the base; naker very brilliant.

REMARK. -- The smallest and most beautiful of all the genus yet discovered in America.

Summary of the Unio.

Species described, - - - - - - - -	28
Varieties particularized, - - - - - -	23
Total of species and varieties,	51
Of which Mr. Say formerly described,	8
We have given new specific names to	20
Of which M. Lamarck had perhaps previously noticed - - - - - - - -	3

End of the Unio.

ALASMODONTA.*

Generick Character.

Shell transverse, equivalve, inequilateral, free; beaks decorticated; posterior muscular impression compound; hinge with prominent cardinal teeth in each valve, but without lateral teeth.

(page 276)

OBSERVATIONS

This genus was established by Mr. Say. The shells are distinguished from those of the genus Unio, by the want of the lateral lamellar tooth, the place of which is commonly occupied by a slightly elevated fold; but no channel can be perceived, nor any interlocking or matching together of the opposite folds. In many specimens the part is perfectly smooth. The sinus at the anterior termination of the ligament is visible in all, and exactly resembles that of the Unio; as do also the colours of the epidermis and of the interior; but the polish of the inside is generally much less brilliant than that of the Unio. The habit of the shells is similar, many of them becoming thick and large.

M. Lamarck seems not to have noticed this genus. He makes the same remark of his Hyria,*

* "From α, without, λασμα(λεπισμαι) a scale, and οδους tooth." -- Mr. Say.

* Generick character of the Hyria of M. Lamarck. Shell equivalve, obliquely triangular, auriculate, truncated and straight at the base; hinge with two teeth slightly elevated; (rampantes.) the cardinal or posterior tooth multipartite, divergent, the interior parts less; the other or lateral tooth very long and lamellar; ligament external and linear. (Naker very brilliant.)

EXPLANATION OF PLATE 5, OPPOSITE PAGE

Unio Praelongus (upper left-hand figure). Page 261 of original text.
Plate 13, Fig. 11 of original.

Unio Ventricosus (next lower left-hand figure). Page 267 of original text.
Plate 13, fig. 14 of original.

Unio Planus (second lowest left-hand figure). Page 272 of original text.
Plate 13, Fig. 16 of original.

Unio Parvus (lowest left-hand figure). Page 274 of original text.
Plate 13, Fig. 18 of original.

Unio Mucronatus (upper right-hand figure). Page 266 of original text.
Plate 13, Fig. 13 of original.

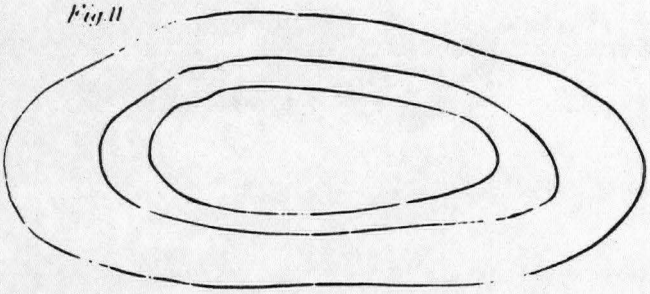
Unio Siliquoideus (next lower right-hand figure). Page 269 of original text.
Plate 13, Fig. 15 of original.

Unio Triangularis (second lowest right-hand figure). Page 272 of original text.
Plate 13, Fig. 17 of original.

Unio Ellipticus (lowest right-hand figure). Page 259 of original text.
Plate 13, Fig. 19 of original. The vertical line on the right-hand side of the figure was caused by a fold in the plate copied.

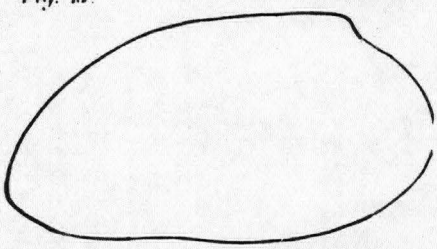
PLATE 5

Fig. 11



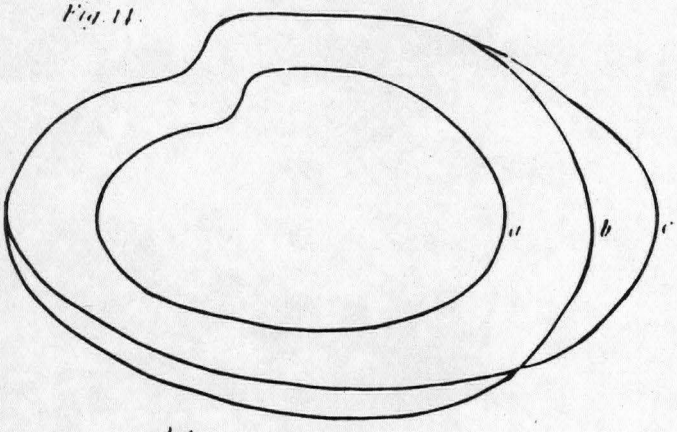
Unio _ Prolongus

Fig. 12.



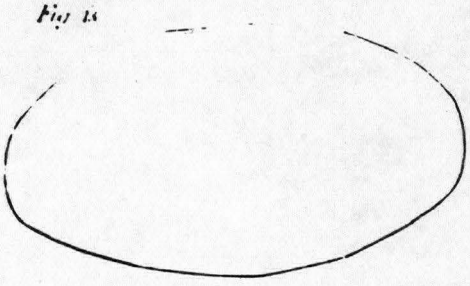
Unio Hamatus

Fig. 14.



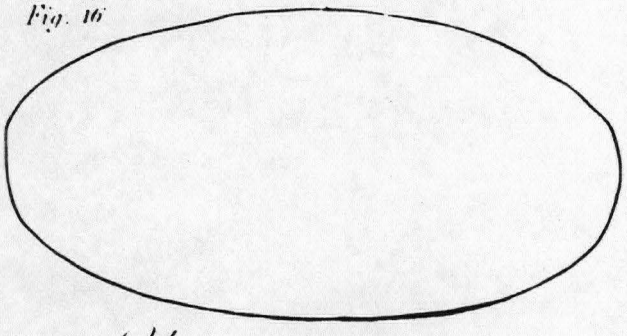
Unio Ventricosus

Fig. 15



Unio Subquadratus

Fig. 16

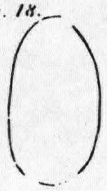


Unio _ Planus

Fig. 17

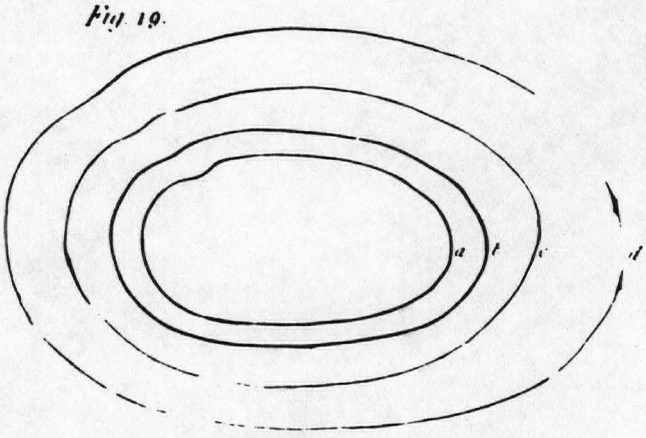
Unio Triangularis

Fig. 18.



Unio _ Ovatus

Fig. 19.



Unio Elliptica

that Mr. Say does of this, "that together with the Dipsas † of Dr. Leach it completes the connexion between the Unio and Anodonta." But no part of his generick character agrees with the present genus except that the shell is equivalve, which is the case in the whole family.

The auricles ǂ of his Hyria and the lamellar tooth forbid the supposition, that he could have intended this shell by his description. It is however properly one of his Naiades, and should be placed next to the Unio.

We subdivide the Genus in two sections, commencing with those that resemble the Unio and ending with those that approach the Anodonta.

Sections.

° Shells thick and large.
°° Shells thin and small.

(Footnotes below are on page 276. Ed.)

(page 277)

° Shells thick and large.

Species.

1. ALASMODONTA ARCUATA. { a. young c. old. b. d. } FIG. 20.

Shell ovate, elongated transversely, thick; base arcuated; ligament elevated; beaks depressed; cicatrices rough.

Hab. West Canada Creek. Mr. R. N. Havens.
A small stream in Tappan. Mr. J. Sears.
Cabinets of the Lyceum and Dr. Mitchill.
My Collection. Mr. Say's Collection.
Diam. 1.2-1.6 Length 2.1-2.6 Breadth 4.1-5.5

---

† The Dipsas of Dr. Leach, has the lamellar lateral tooth, but no cardinal teeth.

ǂ Processes on each side of the beaks, like the scallop, Pecten opercularis.

Shell thick; disks convex above, and compressed below; anterior side very much produced; beaks slightly elevated; ligament elevated above the beaks; hinge margin elevated, compressed, carinate; basal margin arcuated; anterior margin narrow and somewhat pointed; posterior margin rounder and broader than the anteriour; ant. dorsal margin rapidly narrowed and subtruncate; post. dorsal impressed behind the beaks; epidermis brownish black; surface, in young specimens, smooth and glabrous, in old ones, much eroded, scabrous and broken. Teeth two in the right and one in the left valve, triangular, elevated and crenate; muscular impressions rough; cavity of the beaks small; naker bluish white, on the fore parts, lightly iridescent, the rest dull. Young specimens have the center of a pale flesh colour, and the old ones are frequently marked with irregular greenish spots.

REMARKS.-- The remarkable change in the form of this species by age, as represented in the figures, might induce an observer to suppose that the shells belonged to different species; but the specimens in our collections of every variety of form, from those that are straight or even slightly rounded on the base, to those that are deeply arcuated, show clearly that they all belong to the same species. It is surprising that a shell so large, and frequently occurring in our waters should so long have been overlooked. This has

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probably arisen from the supposition that it belonged to the genus Unio, as in its exterior it resembles some varieties of the U. purpureus.

2. ALASMODONTA RUGOSA.-- Fig. 21. Shell oblong-oval, anteriour side with deep divergent folds.

Hab. Wisconsan. Capt. Douglass.
Fox River. Mr. Schoolcraft.
Dr. Mitchill's Cabinet. My Collection.
Mr. Say's Collection.
Diam. 1.0 Length 2.0 Breadth 3.7

Shell oblong-oval, about equally broad before and behind; beaks slightly elevated, wrinkled and decorticated, exhibiting a wax colour beneath; ligament external and as high as the beaks; anteriour lunule distinct with a slightly elevated ridge extending from the beaks to the ant. basal margin; basal margin a little shortened; the other margins regularly rounded; epidermis chestnut brown, with a silky lustre; surface of the anteriour part folded in a pinnate form; folds deeper above and somewhat obsolete below the ridge, curved upward and extending to the hinge and anteriour margins, indenting the edge and visible on the interiour. Teeth large and elevated with a fold behind; cicatrices smooth; cavity small; naker pale flesh coloured in the center, pearly white on the margin with a narrow border of dark chocolate colour; surface smooth and glabrous.

REMARKS. -- This is a very beautiful shell, and unlike any of its congeners. In the one figured, the left valve is slightly compressed, the right a little gibbous and the base crooked, which may perhaps be accidental.

3. ALASMODONTA COMPLANATA. Fig. 22.
Shell ovately quadrangular, hinge margin elevated into a large wing; valves connate; ligament concealed.

Hab. Fox River. Mr. Schoolcraft.
Wisconsan. Capt. Douglass. (°°°)
Cabinets of the Lyceum, and Dr. Mitchill. My collection. Mr. Say's collection.

(°°°) Page 278 ends with this line. Page 279 begins with °Cabinets ..." Space omitted in printing. Ed.

Diam. .9-1.4 Length from beaks to base 3.0
Breadth 5.0 Length from the top of the wing 4.3-4.5

Shell very short behind; disks much flattened; umbones depressed; beaks slightly projecting; ligament between the valves; anterior lunule much compressed and folded across the transverse wrinkles; hinge margin elevated into a large wing, straight and forming an obtuse angle with the post. dorsal margin; basal margin slightly rounded, nearly straight; anteriour and posterior margins somewhat angulated; anteriour dorsal margin arcuated, or somewhat emarginate; epidermis chesuut brown, glossy; surface somewhat deeply wrinkled and striated transversely; slightly elevated ridges and furrows diverging from the beaks to the anteriour margin, and distinctly impressing the inside. Teeth elevated, sulcated and radiating from the beaks; cicatrices smooth; cavity small and angular; naker bluish white and iridescent; surface smooth, and polished, in old specimens spotted with green.

REMARKS. -- This shell resembles the Unio Alatus, in the elevation of the wing and the connexion of the valves, and might at first sight be mistaken for a variety of that species; but it differs in generick character, in shape, and in colour.

°° Shells thin and small.

4. ALASMODONTA MARGINATA. -- See Mr. Say's description.

5. ALASMODONTA UNDULATA. -- See Mr. Say's description and figure.

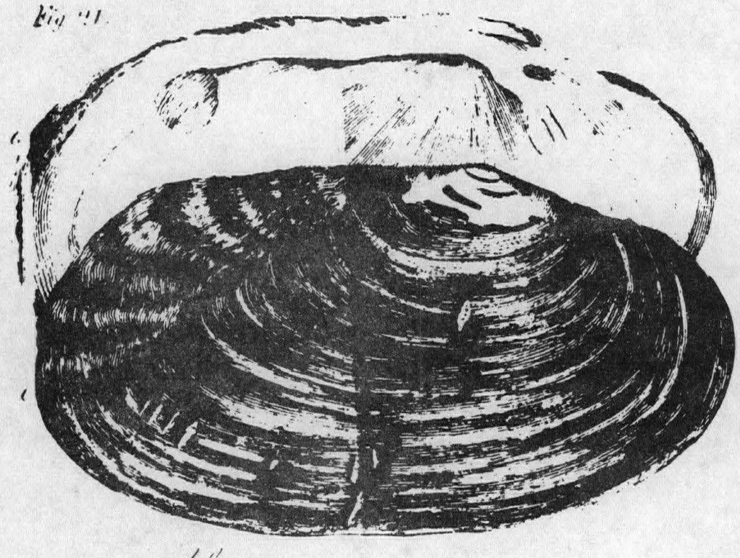
EXPLANATION OF PLATE 6, OPPOSITE PAGE

Alasmodonta Rugosa (upper figure). Page 278 of original text.
Plate 13, Fig. 21 of original. The black line down the middle of the figure was caused by a fold in the plate copied.

Alasmodonta Complanata (lower figure). Page 278 of original text.
Plate 13, Fig. 22 of original. The black line down the right-hand side of the figure was caused by a fold in the plate copied.

PLATE 6

Fig. 21.



Alasmodonta Rugosa

Fig. 22

Alasmodonta Complanata

These two species were the only ones known when Mr. Say published his description. The former of them is very common and assumes a great variety of forms and colours. Those that were brought by the N. W. Expedition are larger than those of our eastern waters. They have the epidermis pale green, rayed; they are gibbous; have the beaks elevated, and base falcated.

Diam. 1.0 Length 1.4 Breadth 2.4

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Our thanks are due to the following gentlemen, for specimens and information.

Gov. Cass of the Michigan Territory.
Capt. D. B. Douglass, Topographical Engineer to the N. W. Expedition.
Mr. H. R. Schoolcraft, Mineralogist to the N. W. Expedition.
Mr. Thomas Say, Philadelphia.
Doctor S. L. Mitchill,
Major Delafield,
Mr. S. B. Collins,
Mr. J. M. Bradhurst,
Rev. J. Sears,
Mr. R. N. Havens,
} of New-York.
Mr. E. Norcross, of the American Museum.

REPRINTS OF RARE PAPERS ON MOLLUSCA. -- ELKANAH BILLINGS ON LAND SNAILS OF THE MOUNTAIN OF MONTREAL. (Canadian Naturalist and Geologist, 2: 97-101, figs. 2-6, 1857).

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4. TERRESTRIAL MOLLUSCA. While turning over the stones in search of geological specimens, I found during a single visit to the mountain no less than five species of land shells. Three of these were easily determined - a fourth appears to be a described

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species, but of the fifth I can find no account, and it may be new. These two must, therefore remain unnoticed for the present.

(Figs. 2 and 3)

Figs. 2 and 3. - Helix Albolabris (Say) (The White Lipped Helix.) Montreal Mountain, 24th April, 1857.

In the above two figures the largest and most common species is represented, and the following is the description given in Gould's Invertebrata of Massachusetts.

(Quotation from Gould omitted here)

This is one of the most abundant of the few species of snails found in Canada. In all newly cleared lands the whitened shells of dead specimens are everywhere to be met with and living ones may be procured by searching under decaying logs, rotten stumps or stones. Limestone cliffs overgrown with small trees and herbage are more especially favoured haunts of this species. Dr. Gould remarks:

"This is our largest snail, and, though so simple in its structure and coloring, is a

pleasing shell. Its delicately striated surface,

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and broad white lip, cannot fail to gain admiration. It is subject to very little variety, the principal variations being the want of the white reflected lip, and the open umbilicus in its immature stages.

"The economy of these animals may be briefly stated as follows: They subsist upon decaying leaves and vegetable fibre, under which they usually shelter themselves. In moist weather and after showers, they issue from their retreats, and crawl over the leaves or up the trunks of trees, until driven back by a change of the weather. In early spring they are often seen collected in groups on the sunny side of the rocks. In June they deposit their eggs, to the number of thirty to eighty, in the light mould by the side of rocks and logs. These are white, opaque, and elastic; and in about twenty to thirty days the young animal issues from them with a shell consisting of one whorl and a half. In October they cease to feed, and select a place under some log or stone where they may be sheltered for the winter, and there they fix themselves with the mouth upwards. This they close by secreting a thin, transparent membrane, and as the weather becomes cold, they grow torpid and remain in that state until the warmth of spring excites them to break down the barrier, and enter upon a new campaign of duty and pleasure."

(Figs. 4 and 5)

Figs. 4 and 5. - Helix Alternata (Saz.)

This species is easily recognised when good specimens are procured, by the numerous bands of brown colour which ornament the surface. It is more depressed or flatter than H. albolabris, and the umbilicus is not covered over, but open, so that all the whorls may be seen from the under side. In the dead and partly decayed shells the colour for the greater part disappears, but the perfect ones make rather handsome cabinet specimens. It is thus described in the work above cited.

(Quotation from Gould omitted here)

(page 100)

The habits of this species are similar to those of H. Albolabris.

(Fig. 6)

Fig. 6. - Helix Monodon (Rackett.)

The species represented by Fig. 6. - "the single-toothed snail," is much smaller than either of the other two, and not so abundant. It has a sort of a tooth on the whorl just at the edge of the aperture. The technical description is thus given.

(Quotation from Gould omitted here).

(page 101)

The hair-like projections above mentioned, and also represented in the figure, did not appear on the specimens I collected on the mountain, and Dr. Gould says they are often wanting at every stage of growth.

E. B.

CHECKLIST OF THE NON-MARINE MOLLUSCA OF QUEBEC

AURÈLE LA ROCQUE

Department of Geology, The Ohio State University, Columbus 10, Ohio

The province of Quebec is at present one of the largest political units of Canada. Its population, and particularly the cities and farms, is concentrated along the St. Lawrence and Ottawa rivers, so that mollusk records for the province are mainly from the southern third. Notable exceptions to this pattern are the records for James Bay and the Ungava Bay regions which have extended the range of many species far to the north on the mainland of North America. The Gaspé peninsula has attracted many shell collectors, a fortunate circumstance which has demonstrated the northeastern extension of dispersal of some species and added many introduced species to the Quebec list. On the other hand, the vast interior region of the province remains largely unexplored. In the past, these great expanses, abundantly provided with lakes and rivers, were inaccessible save for costly and well-organized expeditions. Geological Survey of Canada parties have brought back valuable material from these areas but much still remains to be done to give us adequate knowledge of the molluscan fauna of this region. The situation has changed with the advent of the airplane and the opening of the iron ranges of the interior. It seems to be a good idea, at this time, to consolidate into a provisional checklist the many records for the province.

The following summary of Quebec records will, it is hoped, stimulate collectors to work in the so-far untouched areas.

As for previous lists, every effort has been made to achieve reasonable completeness but additions and corrections will be gratefully acknowledged by the writer.

1. NAIADES

1. ?ALASMIDONTA CALCEOLUS (Lea) 1850. Latchford 1904: 91, south branch of the Quyon River, near Thorne Centre, Co. Pontiac, one specimen. Probably a misidentification, but possible, though far out of range.

2. ALASMIDONTA MARGINATA (Say). Whiteaves 1863: 100 (Margaritana m.), St. Lawrence about Montreal; Yamaska R. near St. Hyacinthe. Latchford and Fletcher 1894: 98, Gatineau River at Farrelton: "Our three Margaritanas were found in abundance ..." Latchford 1882: 54, Rideau and Ottawa rivers. Whiteaves 1895b: 8, "small and typical eastern form" common in the province of Quebec and eastern Ontario.

3. ALASMIDONTA UNDULATA (Say). Whiteaves 1862: 458 (Anodonta u.), St. Charles R., near Quebec. Whiteaves 1863: 100 (Margaritana u.), common in the St. Lawrence down to Quebec.

Latchford 1882: 54, Meech Creek; Ottawa R. Latchford 1887: 114, Ottawa River at Duck Id. Latchford 1889: 66, shoals opposite Templeton Wharf; Duck Id. Latchford 1893b: 116, outlet of Harrington Lake near Alexander's Mill. Whiteaves 1895b: 9, St. Lawrence at Montreal and Quebec; near Ottawa. Latchford and Fletcher 1884: 98, Gatineau River. Latchford 1906b: 187, 188, Ottawa River, Duck Id. Nylander 1914: 140, St. John's River, Aroostook and Fish rivers; rare. La Rocque 1932: 152, Chilcott Lake.

4. ANODONTA CATARACTA Say. Whiteaves1863: 100, Lac Calvaire, near Quebec; abundant in small creeks near the St. Charles River at Quebec; Brome Lake in Eastern Twps. Latchford 1882: 56, Ottawa River (rare). Latchford 1889: 66, Duck Id. Latchford 1915: 52 "at least fifty localities in Quebec and Ontario." La Rocque 1932: 152, Chilcott Lake.

5. (Anodonta cygnea Linnaeus). D'Urban 1860: 99, Rouge River Valley, "in almost every lake we visited." By context, this is one of the common American species.

6. ANODONTA GRANDIS BENEDICTENSIS Lea. Whiteaves 1863:100, Mississisquoi Bay, Lake Champlain. Latchford 1882: 56, Ottawa River, Chats; small lake on Meech Creek; outlet of Leamy's Lake. Latchford and Poirier 1885: 266, Leamy Lake, where it joins the Ottawa. Latchford 1906b: 187,188, Duck Id.; Brigham's Creek.

7. (ANODONTA GRANDIS DECORA Lea). Whiteaves 1862: 458, Montreal. (Probably not a valid variety or subspecies. AL)

8. ANODONTA GRANDIS FOOTIANA Lea. D'Urban 1860: 99, Rouge River Valley; Eagle Nest Lake, Wentworth; Sixteen Island Lake and Bevin's Lake, Montcalm. Whiteaves 1863: 100, same localities. Latchford 1882: 56, Ottawa R. at the Chats; Meech's Creek. Whiteaves 1895b: 4, three small lakes tributary to the River Rouge. Whiteaves 1863: 100 (A. lewisii), Lachine Canal. Whiteaves 1902: 92, Lake Abitibi.

9. ANODONTA IMPLICATA Say. Whiteaves 1863: 100, St. Lawrence near Quebec; Berthier. Latchford 1882: 56, Ottawa River; Chats Canal. Whiteaves 1895b: 5, St. Charles R. near Quebec.

10. ANODONTA MARGINATA Say. D'Urban 1860: 99 (A. fragilis) Rouge River Valley; Eagle Nest Lake, Wentworth; Sixteen Island and Bevin's Lake, Montcalm. Latchford 1882: 56 (A. lacustris) small lake in Masham; (A. fragilis) Meech Lake, common. Poirier 1883: 74, Meech Lake. Latchford 1884: 1052 (A. fragilis) Anticosti. Latchford and Poirier 1885: 265, Gauvreau Lake (A. fragilis and A. lacustris). Whiteaves 1895b: 5, three small lakes in the Rouge River Valley; six miles up the Becscie River, Anticosti; Meach Lake, near Ottawa. Dall 1905: 129, St. Lawrence drainage, including the lakes; Anticosti. Schmitt 1904: 277, Lac du Grand Ruisseau, Lac Saint-Georges; nombreux lacs, étangs et cours d'eau, commune; Baie Ste-Claire, Baie du Renard. Toute l'île. Nylander 1914: 140, St. Johns' River and the lakes and tributaries on muddy bottom; common. Johansen 1924: 163, Lake Princeton, Anticosti.

NOTE: The genus Anodonta needs a thorough revision and this applies especially to the Canadian "species." It is quite possible that the forms accepted here may be reduced in future to only one or two valid species.

11. ANODONTOIDES FERUSSACIANUS (Lea). Whiteaves 1863: 100, creek at L'Orignal; old stone quarries near Mile-End toll-gate, Montreal. Whiteaves 1895b: 4, Mile-End, Montreal. Ortmann 1919: 165.

12. ?ANODONTOIDES FERUSSACIANUS MODESTUS (Lea). Whiteaves 1863: 100, Lake St. John. A form which is scarcely worth recognizing, in my opinion.

13. ?ANODONTOIDES FERUSSACIANUS SUBCYLINDRACEUS (Lea). Bell 1858: 108, Lake St. John. Whiteaves 1863: 100, Lachine Canal; St. Lawrence at Quebec. Latchford 1882: 55, Ottawa River; Chats. Whiteaves 1895b: 7, Lakes Matapedia and St. John to the eastward, to creeks.

rivers and bays at the east end of Lake Superior and north side of Lake Erie to the westward. Same observation as for No. 12.

14. ELLIPTIO COMPLANATUS (Dillwyn). Sheppard 1830: 191 (Unio nanca), Island of Orleans. Bell 1858: 96 (Unio c.), bank of the Gouffre River; p. 97, Lake St. John. D'Urban 1860: 98, Rouge River Valley, nearly every lake in the district and the river itself. Whiteaves 1863: 99, St. Lawrence as far down as Berthier below Quebec. Heron 1880: 37, Meech Lake. Latchford 1882: Ottawa R., Meech Lake, Meech Brook. Latchford and Poirier 1885: 265, La Peche River; Gauvreau Lake; p. 264, Mohr's Wharf, Chats Falls. Latchford 1887: 114, Ottawa River, Duck Id. Latchford 1889: 66, Duck Id. "a distinct variety." Latchford 1893b: 116, outlet of Harrington Lake near Alexander's Mill; Harrington Lake. Whiteaves 1895b: 10, various localities including Lake Temiscaming. Latchford 1906b: 187, 188, Duck Id., sand bars. Nylander 1914: 140, Aroostook, Fish, and St. John's rivers; Temiscouata Lake. Ortmann 1919: 103 (E. violaceus). La Rocque 1932: 152, Chilcott L. Unpublished records: Gatineau River at Alcove; Meach Lake; Gauvreau Lake, Mahon Lake, in the Ottawa region.

15. ELLIPTIO DILATATUS (Rafinesque). Whiteaves 1863: 99, St. Lawrence and tributaries, scarce. Latchford 1882: 50 (Unio gibbosus) Gilmour's Mills, Templeton. Latchford 1889: 66, Duck Id. Whiteaves 1895b: 11, St. Lawrence and Ottawa rivers. Latchford 1906b: 187, 188, Duck Id.

16. LAMPSILIS CARIOSA (Say). Latchford 1882: 51, Black Bay, Eardley, Que.

17. LAMPSILIS RADIATA (Gmelin). Sheppard 1830: 191 (Unio r.) beach at the Id. of Orleans. Whiteaves 1863: 99, abundant in rivers and lakes of Canada East. Latchford 1882: 50, Ottawa River, common. Latchford and Poirier 1885: 264, Mohr's Wharf, Chats. Whiteaves 1895b: 13, Nova Scotia to Ottawa. Ortmann 1919: 292.

NOTE. The writer notes current opinion that L. radiata and L. siliquoidea are synonyms. The records are listed separately here merely to indicate which name was used in the several references cited.

18. LAMPSILIS RADIATA BOREALIS (A. F. Gray). Latchford 1882: 52, Ottawa R.; mouth of Brigham's Creek to Templeton. Latchford 1889: 66, Duck Id. Whiteaves 1895b: 9, Duck Id. Latchford 1906b: 187, 188, sand bars, Duck Id., Ottawa River.

19. LAMPSILIS SILIQUOIDEA (Barnes). Whiteaves 1862: 458 (U. luteolus), common in the St. Lawrence, Quebec and Montreal. Whiteaves 1863: 99, Lower Canada. Latchford 1882: 51, Rideau Canal and River. Latchford and Poirier 1885: 265, Gauvreau Lake. Whiteaves 1902: 92, Ontario side of Lake Abitibi. Latchford 1915: 51, Gauvreau Lake.

20. LAMPSILIS VENTRICOSA (Barnes). Whiteaves 1863: 99 (U. canadensis), Montreal; Id. of Orleans; U. cardium) St. Lawrence, very fine at Quebec. Latchford 1882: 51 (U. occidens) Ottawa, near mouth of Gatineau; Kettle Id.; (U. subovatus) Ottawa R., Deschenes L. (U. canadensis) St. Lawrence near Montreal; Nepean Bay, Ottawa R. Latchford 1887: 114 (U. occidens) Ottawa River. Latchford 1889: 65 (U. occidens) Duck Id. Whiteaves 1895b: 9 (U. canadensis) Ottawa R. near Ottawa; (U. ventricosus), p. 14, St. Lawrence and Ottawa rivers. Dall 1905: 125, St. Lawrence system. Latchford 1906b: 187, 188 (U. occidens) sand bars at Duck Id. Ortmann 1919: 301 (L. ventricosa canadensis).

21. LASMIGONA COMPRESSA (Lea). Whiteaves 1862: 458, Assumption River. Whiteaves 1863: 99 (U. alasmodontinus) L'Assomption River; River St. Pierre, and Lachine Canal near Montreal. Latchford 1915: 52, Moore's Creek, Aylmer road, west of Hull, Quebec.

22. LASMIGONA COSTATA (Rafinesque). Whiteaves 1863: 99, St. Lawrence River about Montreal; Yamaska River near St. Hyacinthe. Baker 1928: 141. La Rocque 1932: 152, Chilcott Lake. Unpublished record: Gatineau River at Alcove.

23. LEPTODEA FRAGILIS (Rafinesque). Latchford 1882: 52 (U. gracilis) Ottawa R. Latchford 1887: 114, Ottawa R. Latchford 1889: 66, shoals opposite Templeton Wharf; Duck Id. Dall 1905: 127 (Lampsilis gracilis) St. Lawrence drainage. Latchford 1906b: 187, 188, sand bars, Duck Id. Baker 1928: 234.

24. LIGUMIA RECTA (Lamarck). Whiteaves 1863: 99 (U. rectus) St. Lawrence at Quebec and Montreal, somewhat rare. Latchford 1882: 50, Ottawa River, rare, near Arnprior. Latchford 1887: 114, Ottawa River at Duck Island. Latchford 1889: 66, Duck Id. Whiteaves 1895b: 13, St. Lawrence and Ottawa rivers. Dall 1905: 126 (Lampsilis rectus) St. Lawrence system. Latchford 1906b: 187, 188: sand bars, Duck Id., sparsely. Ortmann 1919: 276 (Eurynia). Unpublished record: Gatineau River at Alcove.

25. LIGUMIA RECTA LATISSIMA (Rafinesque). Baker 1928: 257. There is some doubt as to the validity of this form. By definition it is the river form and the name should be applied to all records under the species, above, except possibly some of the St. Lawrence River specimens.

26. MARGARITIFERA MARGARITIFERA (Linnaeus). Sheppard 1830: 191 (Unio sinuata), "Island of Orleans, not very common." Identified by me (La Rocque, 1935b) as M. margaritifera but may be another species. Packard 1863: 413 (Alasmodonta arcuata) Salmon River, "Labrador" and Newfoundland. Packard 1867: 280, same record. Whiteaves 1863: 99 (Margaritana m.) St. Charles River, near Quebec; Green and Rimouski rivers; both of the Matapedia lakes; Lake St. John. Bell 1858: 107, river at Rimouski; Lake St. John. Latchford 1884: 1052, Fox River, Anticosti. Whiteaves 1895b: 8, Green and Rimouski rivers; Lake St. John; both the Matapedia lakes; River St. Charles near Quebec City; Assumption River near Rawdon; Lac de la Ferme, Rivière du Loup; Romaine River. Dall 1905: 132 (Margaritana m.) Anticosti, Quebec Province, eastern Canada. Nylander 1914: 140, Aroostook River and some of its tributaries; not seen in St. John's River tributaries above Grand Falls. Schmitt 1904: 277, Rivière de la Baie du Renard, assez rare.

27. OBOVARIA OLIVARIA Rafinesque. Whiteaves 1863: 99 (Unio olivarius), St. Lawrence at Quebec and Montreal. Latchford 1882: 50 (U. ellipsis), Ottawa River: below Kettle Island. Latchford 1887: 114, same. Latchford 1889: 66, same. Whiteaves 1895b: 10, Ottawa River, opposite L'Orignal; near Ottawa; St. Lawrence at Montreal; near Quebec. Latchford 1906b: 187, 188, Duck Id. Ortmann 1919: 229. Baker 1928: 214.

28. PROPTERA ALATA (Say). Whiteaves 1863: 99 (Unio alatus), Ottawa River, near Ottawa; mouth of River Rouge. Latchford 1882: 52 (same name) Ottawa R., rare. Latchford 1887: 114 and 1889: 66, Duck Island; Green's Creek. Dall 1905: 126 (Lampsilis a.), entire drainage of the St. Lawrence. Latchford 1906b: 187, 188 (Unio a.), Duck Island. Ortmann 1919: 252.

29. PROPTERA ALATA MEGAPTERA (Rafinesque). Baker 1928: 244. If the form is accepted as valid, all records above should be placed under this name.

30. STROPHITUS RUGOSUS (Swainson). D'Urban 1860: 99 (Anodonta edentula), Rouge River Valley, and (Alasmodon rugosus), same reference, same locality. Whiteaves 1863: 100 (A. edentula), Lake Matapedia; Brome Lake; (A. undulata), St. Charles River about 3 miles from Quebec. Latchford 1882: 55 (A. undulata), Ottawa River, Kettle Id.; p. 54 (Margaritana rugosa), Ottawa River: Chats Rapids; p. 55 (A. edentula), Ottawa River:

Little Chaudière and Chats Rapids; Mason's Mills (Snye); Meech Creek, appears identical with A. unadilla De Kay. Latchford 1887: 114 (A. undulata), Ottawa River at Duck Id., north shore. Latchford 1889: 66 (A. undulata), same locality. Whiteaves 1895b: 8 (Margaritana rugosa), widely distributed in Quebec and Ontario; p. 3 (A. edentula), Lake Matapedia; small lake in the valley of the River Rouge; St. Charles River near Quebec; Brome Lake. Latchford 1906b: 187, 188 (A. undulata), Duck Island.

2. SPHAERIIDAE

NOTE. This family is under revision by Herrington at present. Until his disposition of the many synonyms has been made it seems best to list the names as they appear in the literature with only such modifications as appear to be certain of final adoption, for example elimination of the genus Musculium.

31. PISIDIUM ABDITUM Haldeman. Latchford 1884: 1052, Anticosti. Whiteaves 1863: 101, Quebec, Montreal. Whiteaves 1895a: 22, foot of Lake Temiscaming. Whittaker 1922: 105, base of peat bed, St. Louis de Gonzague, Beauharnois Co.

32. PISIDIUM ADAMSI (Prime). Heron 1880: 36, a little below Gatineau village on the Ottawa. Latchford 1922: 6, pond near Deschenes Rapids.

33. (Pisidium altile Anthony). Whiteaves 1863: 101, Mile-end, Montreal; St. Charles River, near Quebec; "It is the P. compressum of Prime, but Mr. Anthony's name seems to have priority." (See P. compressum).

34. PISIDIUM COMPRESSUM Prime. Latchford 1922: 5, Chilcott Lake. Whittaker 1922: 105, base of peat bed, St. Louis de Gonzague, Beauharnois Co.

35. ?PISIDIUM DUBIUM (Say). D'Urban 1860: 99, Rouge River Valley: in shell marl, Eagle Nest Lake, and living in the small lake near Hamilton's farm.

36. PISIDIUM MAINENSE Sterki. Whiteaves 1905: 170, Jupiter River, Anticosti.

37. PISIDIUM ROTUNDATUM Prime. Taylor and Latchford 1890: 52, outlet to Leamy's Lake, Hull.

38. PISIDIUM STEENBUCHI (MÖLLER). Packard 1867: 280, Square Island and Strawberry Harbor, Labrador. Dall 1905: 143 (Corneocyclas), Ungava. Whiteaves 1901: 223, Fort Chimo, Ungava. Sterki 1916: 457. Sterki 1926: 26, Ungava, has seen no authentic specimens.

39. PISIDIUM SUBROTUNDUM Sterki. Latchford 1922: 6, Jupiter River, Anticosti, to the Albany and Attawapiscat rivers in northwestern Ontario.

40. ?PISIDIUM VARIABILE Prime. Whiteaves 1862: 458, St. Lawrence at Quebec.

41. PISIDIUM VIRGINICUM Gmelin. Whiteaves 1863: 101, St. Lawrence and St. Charles rivers at Quebec; Montreal; St. Lawrence River and Lachine canal.

42. ?SPHAERIUM ACUMINATUM Prime. Latchford 1920: 33, Lake Deschenes, various localities in Ontario, therefore probable for the Quebec side of the lake. "A mussel believed to be this species."

43. SPHAERIUM AUREUM Prime. Latchford 1920: 30, Moore's Creek, in Hull.

44. SPHAERIUM CRASSUM Sterki. Sterki 1916: 432. Latchford 1920: 30, Masham (a few shells which may be crassum). Baker 1928: 319.

45. SPHAERIUM DECLIVE Sterki. Sterki 1916: 443 (Musculium d.).

46. SPHAERIUM EMARGINATUM Prime. Latchford 1920: 33, Phillips Lake (Co. Pontiac).

47. SPHAERIUM FLAVUM Prime. Latchford 1920: 31, Ottawa; Sparks Mills, west of city.

48. SPHAERIUM OCCIDENTALE Prime. Latchford 1887: 107, Buckingham. Unpublished record: Alcove, dried bottom of pool in woods.

49. SPHAERIUM PARTUMEIUM (Say). D'Urban 1860: 99, Rouge River Valley, ponds and small lakes (Cyclas partumeia?). Taylor and Latchford 1890: 52, outlet of Leamy's Lake, Hull.

50. SPHAERIUM RHOMBOIDEUM (Say). Whiteaves 1862: 458, St. Lawrence at Quebec. Whiteaves 1863: 101, Montreal. Taylor and Latchford 1890: 52, outlet of Leamy's Lake, Hull. Latchford 1920: 32, pond on Duck Id.; Meach Lake.

51. SPHAERIUM ROSACEUM Prime. Latchford 1887: 351, eastern end of McGoey's Lake, near Chelsea. Latchford 1921: 69, bay at the east end of the pond below the outlet of Meach Lake (Id. Tryon.)

52. SPHAERIUM SECURIS Prime. Whiteaves 1863: 101, Montreal, Lachine. Whiteaves 1895a: 22, foot of Lake Temiscaming. Whittaker 1922: 105, base of peat bed, St. Louis de Gonzague, Beauharnois Co.

53. SPHAERIUM SIMILE (Say). D'Urban 1860: 99, Rouge River Valley, living in lakes and in shell marl, Eagle Nest Lake, Wentworth. Whiteaves 1905: 169, Lièvre River at High Rock. Unpublished record: Rouge River at St. Andrews; Chilcott Lake; Gauvreau Lake.

54. SPHAERIUM SOLIDULUM Prime. Whiteaves 1863: 101, creek at L'Orignal.

55. ?SPHAERIUM STAMINEUM Conrad. Latchford 1920: 33, outlet of Swan Lake in Pontiac Co., a shell doubtfully considered stamineum, but which may be an undescribed species.

56. SPHAERIUM STRIATINUM Lamarck. Whiteaves 1863: 101, Lachine Canal, near Montreal; St. Lawrence and St. Charles rivers, near Quebec. Whiteaves 1895a: 22, foot of Lake Temiscaming. Whiteaves 1902: 92, Ontario side of Lake Abitibi. Nylander 1914: 140, Fish River, in St. John's River at Fort Kent, and in Madawaska River at St. Rose. Latchford 1916: 93, shores of Duck Island (S. striatinum var. or new). Latchford 1920: 34, sandy shoals, north shore of Duck Island.

57. SPHAERIUM SULCATUM Lamarck. Whiteaves 1863: 100, Metis Lakes, and a small lake six miles southwest of Métis; St. Lawrence at Montreal. Latchford and Poirier 1885: 265, Gauvreau Lake: had almost entirely disappeared. Latchford 1887: 351, McGoey's Lake, near Chelsea. Whiteaves 1895a: 22, foot of Lake Temiscaming. Latchford 1919: 84, creek 100 yards west of Ste Justine Station, Vaudreuil Co.; small lake below the outlet of Meach Lake; Gauvreau Lake. Nylander 1943: 45, marl, east Bonaventure.

58. SPHAERIUM SULCATUM PALMATUM Sterki. Latchford 1919: 83, Masham. A misspelling of S. sulcatum planatum.

59. SPHAERIUM TENUE (Prime). Sterki 1916: 438.

60. SPHAERIUM TORSUM Sterki. Sterki 1916: 434. Latchford 1916: 93, Ottawa River; Moore's Creek, abundant. Latchford 1920: 33, Moore's Creek, the type locality. Baker 1928: 331.

61. SPHAERIUM TRANSVERSUM Say. Whiteaves 1863: 101, Lachine Canal, near Montreal; St. Lawrence near Quebec. Latchford 1920: 70, shores of Duck Island.

62. SPHAERIUM TRUNCATUM Linsley. Latchford 1920: 71, Ottawa River, Nepean Bay and Duck Island.

63. SPHAERIUM VERMONTANUM Prime. Sterki 1916: 435. Latchford 1920: 70, Lakes Champlain, Memphremagog. Ste Cécile de Masham.

64. SPHAERIUM WALKERI Sterki. Whiteaves 1905: 170, headwaters of the Chibougamau branch of the Nottawa River, northern Quebec, A. P. Low, 1905.

3. FRESHWATER PULMONATES

65. APLEXA HYPNORUM (Linnaeus). D'Urban 1860: 97 (Physa elongata), Rouge River Valley, in pools on grass, near Grenville. Whiteaves 1863: 104 (Physa hypnorum), Quebec and Montreal; Green Island; Metis; St. Anne. Latchford 1884: 1052 (Bulinus), Anticosti. Provancher 1890: 146, Lévis, etc.; Taylor and Latchford 1890: 56, Ottawa district.

66. APLEXA HYPNORUM ARCTICA (Clessin). Walker 1918: 116, Hudson Bay.

67. BULIMNEA MEGASOMA (Say). Whiteaves 1863: 102, Nuns' Island, near Montreal. Small and Symes 1882: 58, Meech Lake; Nuns' Island, almost extinct. Latchford 1887: 351, McGoey's Lake, near Chelsea. Provancher 1890: 140, Lake Champlain; Hawkesbury, Ont. Latchford 1893: 115, Meach Lake. Baker 1911: 184. Latchford 1806a: 172, Meach Lake, rare. Unpublished record: Blue Sea Lake.

68. FERRISSIA BOREALIS (Morse). Nylander 1914: 140, St. John's River at Fort Kent.

69. FERRISSIA PARALLELA (Haldeman). Small and Symes 1882: 58, Ottawa River. Whiteaves 1905: 170, Aylmer; Montreal?

70. FERRISSIA RIVULARIS (Say). Whiteaves 1863: 104 (Ancylus rivularis? may be parallelus Hald.), St. Lawrence River at Quebec and Montreal; St. Charles River near Quebec. Provancher 1890: 150, Rivière St-Charles, etc. Whittaker 1922: 105, peat, Beauharnois Co.

71. FOSSARIA EXIGUA (Lea). D'Urban 1860: 97, Rouge River Valley, small lake near Hamilton's Farm. Whiteaves 1863: 103, quoting D'Urban.

72. FOSSARIA GALBANA (Say). D'Urban 1860: 97 (Limnaea galbauns), Rouge River Valley; abundant in shell marl from the bottom of Eagle Nest Lake, Wentworth. Whiteaves 1863: 103, quoting D'Urban. Dall 1905: 74, Anticosti, Pleistocene. Baker 1911: 291. Unpublished record: Chilcott Lake.

73. FOSSARIA HUMILIS (Say). Whiteaves 1863: 103, Green Island village; Rimouski; St. Anne; Lake Calvaire near Quebec; ponds near Mile End toll gate, Montreal (Limnaea h.). Provancher 1890: 144. Whiteaves 1895a: 22, foot of Lake Temiscaming. Unpubl. record, Gauvreau Lake, identification doubtful.

74. FOSSARIA MODICELLA (Say). Bell 1858: 108, Lake St. John; Rimouski. Baker 1928: 289, eastern Quebec.

75. FOSSARIA OBRUSSA (Say). Baker 1911: 270, living.

76. FOSSARIA PARVA (Lea). Baker 1928: 285, James Bay southward.

77. FOSSARIA UMBILICATA (Say). D'Urban 1860: 97, Rouge River Valley; in pools near Grenville. Nylander 1943: 45, marl, east Bonaventure.

78. GYRAULUS ARCTICUS ("Beck" Möller). Whiteaves 1901b: 223, Fort Chimo. Dall 1905: 96, Fort Chimo. Walker 1918: 96, Greenland; Quebec. Baker 1928: 380.

79. (GYRAULUS BILLINGSI Lea). Walker 1918: 96, synonym of parvus.

80. GYRAULUS CIRCUMSTRIATUS WALKERI (Vanatta). Baker 1928: 379, Quebec.

81. GYRAULUS DEFLECTUS (Say). D'Urban 1860: 98, Rouge River Valley; Sixteen Island and Sugarbush lakes, Montcalm. Whiteaves 1862: 458, streams near Quebec. Whiteaves 1863: 104, near Quebec; Great Lake Matapedia. Latchford 1884: 1052, Anticosti. Latchford and Poirier

1885: 265, Gauvreau Lake, found in 1881, had disappeared in 1884. Whiteaves 1895a: 22, foot of Lake Temiscaming. Unpublished record, Chilcott Lake.

82. GYRAULUS DEFLECTUS OBLIQUUS (De Kay). Baker 1945: 70, 268, 330, 336, Taylor Lake, Masham Co.

83. GYRAULUS HIRSUTUS (Gould). Sheppard 1830: 195, near Etchemin (Planorbis albus). Latchford and Poirier 1885: 266, mouth of Brigham's Creek (P. albus). Latchford 1893b: 115, Harrington Lake.

84. GYRAULUS NATHORSTI (Westerlund). Dall 1905: 96, Labrador.

85. GYRAULUS PARVUS (Say). Bell 1858: 105, between York River and Gaspé Basin. D'Urban 1860: 98, Rouge River Valley; shell marl, Eagle Nest Lake, Wentworth; living in lakes near Indian Village and near Hamilton's Farm. Whiteaves 1863: 104, widely distributed and plentiful throughout the district. Latchford 1884: 1052, Anticosti. Whittaker 1922: 105, peat, St. Louis de Gonzague, Beauharnois Co. Nylander 1943: 45, marl, E. Bonaventure. Baker 1945: 74, Meach Lake.

86. HELISOMA ANCEPS (Menke) 1830. D'Urban 1860: 98 (Planorbis bicarinatus), Rouge River Valley; shell marl and living, Eagle Nest Lake, Wentworth; and in a small lake near Hamilton's farm. Whiteaves 1863: 104, Quebec, a var. with transverse wrinkles... Latchford and Poirier 1884: 132 (P. bicarinatus), brooks in Hull and Masham. Latchford 1884: 1052, Anticosti. Latchford and Poirier 1885: 266, mouth of Brigham's Creek. Provancher 1890: 148 (P. bicarinatus), Cap Rouge, Ristigouche, etc. Latchford 1893a: 115, Harrington Lake. Whiteaves 1895a: 22, foot of Lake Temiscaming. Whittaker 1922: 105, peat bed, St. Louis de Gonzague, Beauharnois Co. La Rocque 1932: 152, Chilcott Lake. Unpublished records: Rouge River at St. Andrews, Argenteuil Co.; Gauvreau Lake.

87. HELISOMA ANCEPS ANTICOSTIANUM F. C. Baker 1945: 219, English Bay, Anticosti.

88. HELISOMA ANCEPS LATCHFORDI (Pilsbry). Whiteaves 1863: 104, Brome Lake (Planorbis bicarinatus). Heron 1880: 37, (P. bicarinatus), Meach Lake. Latchford and Poirier, 1884: 132, Meach Lake. Latchford 1889: 67, Meach Lake. Latchford 1893: 116, Meach and Brome lakes. Baker 1945: 128, Meach Lake; also pp. 280, 324, 344, 406. Unpublished record: Taylor Lake, id. F. C. Baker.

89. HELISOMA ANCEPS PORTAGENSE (F. C. Baker). Baker 1945: 406, Meach Lake. Probably a misprint for No. 88.

90. (HELISOMA BINNEYI Tryon). Latchford 1911a: 19, several localities in Ontario and Meach Lake, Quebec. Probably an error for H. infracarinatum F. C. Baker.

91. HELISOMA CAMPANULATUM (Say). D'Urban 1860: 98 (Planorbis c.), Rouge River Valley, several lakes. Whiteaves 1863: 104, near Quebec; fine at Brome Lake; common in Richelieu River at St. Johns; St. Helen's Island, Montreal; near Grenville, etc. Latchford 1884: 1052, Anticosti. Provancher 1890: 148, Montreal, Métis and Matapedia lakes, etc. Dall 1905: 90, Anticosti. La Rocque 1932: 152, Chilcott Lake. Unpublished records: Gauvreau Lake, Mahon Lake.

92. HELISOMA CAMPANULATUM DALLI F. C. Baker 1945: 226, Anticosti Island, in marl.

93. HELISOMA CAMPANULATUM WISCONSINENSE (Winslow). Whittaker 1919: 127-134. Baker 1928: 351, "probably Quebec." Unpublished record: Meach Lake.

94. (HELISOMA CORPULENTUM (Say)). Latchford 1889: 67, Brigham's Creek and the Peche River in Masham. Probably refers to H. infracarinatum F. C. Baker.

95. HELISOMA INFRACARINATUM F. C. Baker. Provancher 1890: 147, Ottawa River.

not found near Quebec (Planorbis trivolvis, superbes specimens). La Rocque 1935a: 34, Gauvreau Lake. Unpublished record: Rouge River, at St. Andrews, Argenteuil Co.

96. HELISOMA TRIVOLVIS (Say). Bell 1858: 107, Lake Kenogami. D'Urban 1860: 98, small lake one mile west of the Indian Village on the Rouge, Arundel Twp. Whiteaves 1863: 104, St. Lawrence at Montreal (P. lentus) and common throughout Lower Canada (P. trivolvis). Latchford and Poirier 1885: 226, mouth of Brigham's Creek, Gauvreau Lake, Mohr's Wharf, Chats. Provancher 1890: 147, Montreal. Whiteaves 1895a: 22, foot of Lake Temiscaming. Nylander 1943: 45, marl, E. Bonaventure. Unpublished records: Kettle Island, Ottawa River; Meach Lake; Mahon Lake. La Rocque 1932: 152, Chilcott Lake.

97. HELISOMA TRIVOLVIS MACROSTOMUM (Whiteaves). Whiteaves 1863: 104, ponds near the Mile-end toll-gate, Montreal (Planorbis macrostomus). Provancher 1890: 147, Cap Rouge. Whiteaves 1895a: 22, foot of Lake Temiscaming. Baker 1945: 147, Gauvreau Lake; also pp. 294, 412.

98. ?LAEVAPEX FUSCA (Adams). Whiteaves 1863: 104, ponds near Mile End toll-gate, Montreal (Ancylus fuscus?). The original record was doubtful and it is quite likely that it was erroneous. No further record for the province is known to me.

99. ("Limnaea alternata, or a new species."). Whiteaves 1863: 103, Point Lévis. This record probably belongs under one of the many Lymnaeidae recorded for Quebec but it would be difficult to place it definitely.

100. LYMNAEA STAGNALIS (Linnaeus), undifferentiated as to variety or form. Sheppard 1830: 196, abundant at Sorel. Whiteaves 1863: 102, common at Montreal in the St. Lawrence but rare at Quebec; Métis lakes and lakes on the Rimouski River. Latchford 1884: 1052, Anticosti. Provancher 1890: 139, Quebec, Bécancour. Nylander 1943: 45, marl, E. Bonaventure.

101. LYMNAEA STAGNALIS JUGULARIS (Say). Heron 1880: 37, Rideau Canal, but common elsewhere. Latchford 1893a: 118, Chilcott's Lake, Masham, albino. Latchford 1911b: 68, Ottawa River, Hull. Whittaker 1922: 105, base of peat bed, St. Louis de Gonzague, Beauharnois Co. La Rocque 1935a: 34, Ottawa and Gatineau rivers; Mahon, Chilcott, Moncrief, Lamey, Constance, Fairy, and Johnston lakes. Unpublished records: Ile St. Paul, Montreal; Rouge River at St. Andrews, Argenteuil Co.; Meach Lake; six miles up Becscie River, Anticosti, young specimen, form doubtful.

102. LYMNAEA STAGNALIS LILLIANAE F. C. Baker. Latchford 1893b: 115, Harrington Lake, Meach Lake. La Rocque 1935a: 34, Bernard, Meach, Phillip Lakes.

NOTE. Some of the specimens on which the above records are based have been examined by me and assigned to forms following Baker's criteria. Those records for which specimens were not available, or for which assignment was doubtful, have been placed under the species (No. 100).

103. PHYSA ANCILLARIA (Say). Bell 1858: 107, Rimouski. Whiteaves 1863: 103, St. Charles River near Quebec; near Montreal; Rimouski village (Id. Clench). Latchford and Poirier 1885: 264, around the islands at the foot of the Little Chaudière, depauperate form. Provancher 1890: 145, rare around Quebec City. Nylander 1914: 141, Temiscouata Lake.

NOTE. Records for Physa have been given here under several names which probably represent only one or two species. Until the synonymy of the genus is definitely cleared up, this method of presenting the records seems to be best.

104. PHYSA BREVISPIRA Lea. Walker 1918: 108, Quebec, no specific locality.

105. PHYSA ELLIPTICA (Lea). Bell 1858: 108, Lake St. John. D'Urban 1860: 97, Rouge River Valley. Unpublished records: Montmagny (id. W. J. Clench); Ottawa River at Lemieux Id. (id. W. J. Clench).

106. ?PHYSA ELLIPTICA AUREA Lea. Bell 1858: 107, Rimouski River and in a tributary brook. D'Urban 1860: 97, Rouge River Valley: sparingly in a small lake near Hamilton's Farm. Whiteaves 1863: 104, Rimouski Co., several localities; near Quebec.

107. (PHYSA FONTINALIS). Sheppard 1830: 195, Island of Orleans.

NOTE. I have placed this record in parentheses as improbable, but without being able to place it under an American species. Perhaps, after all, this European species was introduced here.

108. PHYSA HETEROSTROPHA Say. Bell 1858: 107, ditches. D'Urban 1860: 97, Rouge River Valley, pools on grass near Grenville, and Sugarbush Lake, Montcalm. Packard 1863: 424, south side of Anticosti. Whiteaves 1863: 103, common throughout Lower Canada. Latchford 1884: 1052, Anticosti. Latchford and Poirier 1885: 264, around the islands at the foot of the Little Chaudière, a depauperate form; mouth of Brigham's Creek; La Peche River; Scott's Creek, near Hull. Provancher 1890: 145, Magdalen Islands; Hanham 1893: 66, Gaspé Basin (most likely h.). Whiteaves 1895a: foot of Lake Temiscaming. Dall 1905: 101, Anticosti, etc. Nylander 1914: 140, Maine, near Quebec border. Schmitt 1904: 279, Anticosti. Unpublished record: Île St. Paul, Montreal (id. Clench); Anticosti (id. Clench).

109. PHYSA LATCHFORDI F. C. Baker (or PHYSA PARKERI (Currier) fide Clench). Heron 1880: 37 (P. lordi), Meech Lake; also p. 62, fig. Latchford and Poirier 1887: 351, McGoey's Lake, near Chelsea. Latchford 1889: 67, Meach Lake. Latchford 1893b: 116, outlet of Harrington Lake, near Alexander's Mill; Meach Lake; Harrington Lake. Provancher 1890: 145, Brome Lake. All these records under P. Lordi. Whiteaves 1906: 115 (P. ancillaria, large form, id. Dall), Meach Lake. La Rocque 1932: 152, Chilcott Lake, young, doubtful. Specimens in the National Museum of Canada, the Fairbairn collection, and my own have been identified as P. parkeri by Clench.

110. (Physa marginata Lea). Whiteaves 1863: 104, near Rimouski Village.

111. PHYSA SAYII Tappan. Nylander 1914: 141, Maine and New Brunswick, near Quebec border. Unpublished record: Johnston Lake, Masham Co., id. Clench.

112. (PHYSA SUBOPACA). Sheppard 1830: 195, Island of Orleans.

113. PLANORBULA ARMIGERA (Say). Whiteaves 1862: 458, near Quebec. Whiteaves 1863: 104: Montreal, Nuns' Island, ponds on top of Montreal Mountain. Heron 1880: 37, no specific locality, but Ottawa District. Provancher 1890: 149, Quebec, Gaspé, Anticosti, etc.

114. PROMENETUS EXACUOUS (Say). Sheppard 1830: 195, water near Etchemin (Planorbis spirorbis). Whiteaves 1863: 104, swamps near the City Mills, Montreal (Planorbis exacutus). Taylor and Latchford 1890: 56, no specific locality. Whittaker 1922: 105, base of peat bed, St. Louis de Gonzague, Beauharnois Co.

115. PSEUDOSUCCINEA COLUMELLA (Say). Whiteaves 1862: 458, St. Lawrence near Quebec. Whiteaves 1863: 102, same. Latchford and Poirier 1884: 132, Ottawa River. Provancher 1890: 140, Cap Rouge, Ottawa, etc. Baker 1928: 272. Unpublished record: Gauvreau Lake.

116. (STAGNICOLA AMPLA Mighels). Whiteaves 1863: 102 (Limnaea a.), Brome Lake. Provancher 1890: 140, Lakes Métis and Brome. Probably forms of S. emarginata, q. v.

117. STAGNICOLA ANTICOSTIANA (Dall). Dall 1905: 79, Pleistocene marl of Marl Lake, Anticosti. Baker 1911: 106, Pleistocene.

118. ?STAGNICOLA APICINA (Lea). Bell 1858: 107, brook tributary of Rimouski River. Record very probably erroneous.

119. STAGNICOLA CAPERATA (Say). Bell 1861: 43, ponds on top of Montreal Mountain, Mr. Peel's clay pits, Montreal. Whiteaves

1863: 103, St. Charles River, near Quebec. Heron 1880: 39, Ottawa district. Latchford and Poirier 1885: 264, Mohr's Wharf, Chats. Provancher 1890: 143, British Columbia, Hudson Bay. Baker 1911: 225. Baker 1928: 260.

120. STAGNICOLA CATASCOPIUM (Say). Bell 1858: 105, Dartmouth River a few miles above its mouth, Gaspé Bay; p. 107, brook tributary to Rimouski River. Whiteaves 1863: 103, St. Charles River, near Quebec; Cap Rouge. Heron 1880: 39, Ottawa District. Small and Symes 1882: 58, Brigham's Creek; Nepean Bay, Ottawa River; Chats Rapids, near Arnprior. Latchford and Poirier 1885: 264, Mohr's Wharf, Chats; p. 266, Brigham's Creek. Provancher 1890: 143, Cap Rouge. Hanham 1893: 66, Gaspé Basin. Dall 1905: 78, Ungava. Latchford 1911b: 68, Little Chaudière Rapids, formerly identified as L. decollata.

121. STAGNICOLA DECOLLATA (Mighels). Whiteaves 1863: 102, Great Lake Matapedia; Rimouski Village; Provancher 1890: 140, Canada, Maine, etc.

122. STAGNICOLA DESIDIOSA (Say). Whiteaves 1863: 103, Upper Lake Metis; Marl Lake, Anticosti (the var. acuta, which probably belongs under S. anticostiana, A.L.). Heron 1880: 39, Ottawa district. Latchford and Poirier 1885: 265, Gauvreau Lake. Provancher 1890: 142, Métis Lake; Anticosti. Hanham 1893: 66, Gaspé Basin. Whiteaves 1895a: 22, foot of Lake Temiscaming.

123. STAGNICOLA EMARGINATA (Say). Small and Symes 1882: 58, Ottawa and Rideau rivers. Latchford 1884: 1052, Anticosti (probably S. anticostiana, A.L.). Latchford and Poirier 1885: 264, Scott's Creek, near Hull. Provancher 1890: 143, Cap Rouge. Nylander 1914: 140, Maine and New Brunswick, near Quebec border.

124. STAGNICOLA EMARGINATA CANADENSIS (Sowerby). Baker 1911: 427. Nylander 1914: 140, Temiscouata Lake. Baker 1928: 239, Anticosti Island westward and southward. La Rocque 1932: 152, Chilcott Lake (as S. emarginata laurentiana Latchford).

125. STAGNICOLA EMARGINATA MIGHELSI (Binney). Dall 1905: 68, Brome Lake. Baker 1910: 59, Brome Lake (as Lymnaea e. wisconsinensis). Baker 1911: 416, 420, corrected to S. e. mighelsi).

126. ?STAGNICOLA GROENLANDICA (Beck). Bell 1858: 105, between York River and Gaspé Basin. Probably a misidentification.

127. (STAGNICOLA LANCEATA Gould). Taylor and Latchford 1890: 52, Ottawa district, "were young L. stagnalis." Latchford 1911b: 68, Lymnaea lanceata Gould should be dropped from the Ottawa list.

128. (STAGNICOLA LEPIDA Gould). Small and Symes 1882: 58 (Limnaea lepida), Meach Lake, id. Tryon. Erroneous record.

129. STAGNICOLA ORONENSIS (Baker). Latchford 1911b: 68 (Galba o.), Ottawa district.

130. STAGNICOLA PALLIDA (Adams). Whiteaves 1863: 103, Great Lake Matapedia; Cape Chat.

131. STAGNICOLA PALUSTRIS (Müller). Sheppard 1830: 196, Quebec, "ponds formed by the melted snow in the spring." Latchford 1884: 1052, Anticosti. Latchford and Poirier 1885: 264, Ottawa district. Provancher 1890: 141, Hull. Hanham 1893: 66, Gaspé Basin. Baker 1911: 298. Whittaker 1922: 105, base of peat bed, St. Louis de Gonzague, Beauharnois Co.

132. STAGNICOLA PALUSTRIS ELODES (Say). Whiteaves 1863: 103, common everywhere. Heron 1880: 39, Ottawa District. Unpublished record: Kettle Island, Ottawa River, id. F. C. Baker.

133. STAGNICOLA PALUSTRIS UNGAVA (Baker). Whiteaves 1901b: 222 (Limnaea palustris var. Vahlii), specimens in National Museum of Canada (3271) id. by F. C. Baker, 1934.

134. ?STAGNICOLA PLICATA (Lea). D'Urban 1860: 97, Rouge River Valley, on dead leaves in Sugarbush Lake, Montcalm.

135. STAGNICOLA REFLEXA (Say). D'Urban 1860: 97, Rouge River Valley, near Grenville. Whiteaves 1863: 102, Upper Metis Lake. Provancher 1890: 141, Ste Louise. Baker 1911: 332. Baker 1928: 221, eastern Quebec west to Nebraska.

136. (STAGNICOLA ROWELLII). Provancher 1890: 142, St. Césaire, Yamaska River. (Erroneous record. A.L.).

137. STAGNICOLA SOLIDA (Lea). Whiteaves 1863: 103, St. Lawrence at Quebec; Métis; Rimouski; White rivers. Provancher 1890: 144, British Columbia.

138. STAGNICOLA UMBROSA (Say). Bell 1858: 100, Magdalen River; p. 105, York River (like *umbrosa* but regarded by Lea as new). Bell 1861: 43, Montreal, ponds on top of Montreal Mountain. Whiteaves 1863: 102, Point Lévis; Montreal Mountain; Ste Anne; creek about two miles below Chat River; Metis and Restigouche rivers. Heron 1880: 39, Ottawa District.

4. FRESHWATER OPERCULATES

139. ?AMNICOLA DECISA Haldeman. Small and Symes 1882: 57, Leamy's Lake, Hull. Record never confirmed.

140. AMNICOLA INTEGRA Say. Taylor and Latchford 1890: 55 (*Amnicola cincinnatiensis* Anth.). Ottawa District.

141. AMNICOLA LIMOSA (Say). NOTE: records under the species include the many citations for the "var." *porata*. Whiteaves 1863: 102, Lake Calvaire, near Quebec; Little Lake Matapedia; near Montreal. Small and Symes 1882: 57, several lakes in Ottawa County. Latchford and Poirier 1885: 265, Gauvreau Lake. Provancher 1890: 97, Lac Calvet à St-Augustin. Taylor and Latchford 1890: 55, Ottawa District. Whiteaves 1895a: 22, foot of Lake Temiscaming. Whittaker 1922: 105, base of peat bed, St. Louis de Gonzague, Beauharnois Co. La Rocque 1932: 152, Chilcott Lake.

142. ?AMNICOLA PALLIDA Haldeman. Taylor and Latchford 1890: 52, 55, "local specimens of this species are in the Geological and Natural History Museum."

143. AMNICOLA WALKERI Pilsbry. Baker 1928: 114, "Upper St. Lawrence drainage from Ottawa, Ontario, to Lake Michigan."

144. BULIMUS TENTACULATUS MAGNALACUSTRIS F. C. Baker. Baker 1928: 81, Ottawa River. La Rocque 1935a: 34, Duck Island; foot of Bank Street, Ottawa. (The variety is probably invalid. A.L.)

145. CAMPELOMA DECISUM (Say). ?Sheppard 1830: 196, island of Orleans; identification doubtful; "*Paludina* ----?" which might be interpreted as this species. D'Urban 1860: 98, Rouge River Valley; Ottawa River; St. Lawrence River. Whiteaves 1863: 101, common throughout the district; St. Lawrence, about Montreal. Heron 1880: 36, in all rivers and ponds about Ottawa. (All preceding records under *Paludina*). Latchford and Poirier 1885: 265, Gauvreau Lake, rare. Provancher 1890: 100 (*Paludina*), Bécancour River, Montreal, etc. Taylor and Latchford 1890: 55, La Rocque 1932: 152, Chilcott Lake. Unpublished records: Gauvreau Lake; Gatineau River at Alcove; Rouge River at St. Andrews, Co. Argenteuil.

146. ?CAMPELOMA RUFUM Haldeman. Latchford and Poirier 1885: 266, La Peche River beyond Masham Mills. Probably based on a rusty specimen of *C. decisum*.

147. GONIOBASIS HALDEMANI Tryon. Provancher 1890: 94, Montreal, Varennes, Lake Champlain.

148. GONIOBASIS LIVESCENS (Menke). Heron 1880: 37 (*Melania*), Ottawa River. Provancher

1890: 94, Cap Rouge, and almost all our rivers. Taylor and Latchford 1890: 55.

149. GONIOBASIS LIVESCENS NIAGARENSIS Lea. Whiteaves 1863: 102 (Melania n.). St. Lawrence from Quebec to Montreal.

150. ?LITTORIDINA TENUIPES Haldeman. Whiteaves 1863: 102, St. Lawrence near Quebec. The record is not impossible, but it has not, to my knowledge, been confirmed.

151. ?LYOGYRUS GRANUM Say. Provancher 1890: 97, no specific locality, but presumably Quebec.

152. PLEUROCERA ACUTUM Rafinesque. Whiteaves 1863: 102 (Melania subularis Lea). St. Lawrence at Montreal.

153. ?POMATIOPSIS LAPIDARIA (Say). Provancher 1890: 98, no specific locality but presumably Quebec. Taylor and Latchford 1890: 55, doubtful for Ottawa region, referring to Heron 1880: 39, listed as "Amnicola lapidaria? Hald." simply for Ottawa.

154. VALVATA BICARINATA NORMALIS Walker. Whittaker 1922: 105, base of peat bed, St. Louis de Gonzague, Beauharnois Co.

155. (VALVATA HUMERALIS Say). Whiteaves 1863: 102, Matane; small lake at the head of Awaganasees brook; and Little Lake Matapedia. This record probably belongs under V. lewisii or V. sincera.

156. VALVATA LEWISII Currier. Whiteaves 1905: 64, Fort Chimo, Ungava, as northeasternmost known record, but not Anticosti. Fairbairn Collection, No. 301, Ottawa River below Chaudière Falls, id. A. L.

157. VALVATA SINCERA Say. Whiteaves 1863: 102, Marl Lake, Anticosti. Latchford 1884: 1052, Anticosti. Taylor and Latchford 1890: 55, Ottawa. Whiteaves 1895a: 22, foot of Lake Temiscaming. Walker 1906: 28, Anticosti, teste Dall and Walker. Schmitt 1904: 279, Anticosti, ponds and lakes, common. Whiteaves 1905: 65, Anticosti; Attawapiskat and Kawinogans rivers and the southwest point of Anticosti; the former records refer to partially uncoiled specimens. Dall 1905: 122, same records. Whiteaves 1901b: 223, three lakes in Co. Rimouski; Lachine Canal at Montreal; Anticosti; shell marls in Quebec and Ontario from Anticosti to Owen Sound (Ontario). Whiteaves 1901b: 223, Fort Chimo. Whittaker 1922: 105, base of peat bed, St. Louis de Gonzague, Beauharnois Co. Baker 1928: 23, Anticosti and Maine westward.

158. VALVATA TRICARINATA Say. D'Urban 1860: 98, Rouge River Valley: shell marl, bottom of Eagle Nest Lake, Wentworth. Whiteaves, 1863: 102, Quebec. Heron 1880: 36, Ottawa. Provancher 1890: 99, Lake Champlain, Quebec, etc. Taylor and Latchford 1890: 55, Ottawa. Whiteaves 1895a: 22, foot of Lake Temiscaming. Whittaker 1922: 105, base of peat bed, St. Louis de Gonzague, Beauharnois Co. Unpublished record: Chilcott Lake.

5. LAND GASTROPODA

159. ANGULSPIRA ALTERNATA (Say). Sheppard 1830: 194 (Corocolla dubia), on the bank near the plains of Abraham, Quebec. Bell 1858: 100 (Helix alternata), mouth of Magdalen River; p. 107, Chicoutimi. D'Urban 1860: 97, Rouge River Valley, abundant. Whiteaves 1863: 106, everywhere in Lower Canada. Heron 1880: 40, Ottawa. Provancher 1890: 119, rare near Quebec. Taylor and Latchford 1890: 57, Ottawa. Hanham 1893: 66, Barachois (Patula a.). Whiteaves 1895a: 22, foot of Lake Temiscaming. Hanham 1897: 99 (Pyramidula a.), common on side of cliff, Isle d'Orleans. Dall 1905: 49, Lower Canada (Pyramidula a.).

160. ARION CIRCUMSCRIPTUS Johnston. Dundee and Dundee 1958: 52, Quebec; good summary of distribution in North America.

161. CARYCHIUM EXIGUUM Say. D'Urban 1860: 97, Rouge River Valley, Sixteen Island Lake. Whiteaves 1863: 107, quoting D'Urban.

Heron 1880: 38, Ottawa District. Provancher 1890: 137, Canada, etc. Hanham 1893: 66, Barachois. Hanham 1897: 102, locality unspecified. Vanatta 1914: 223, Grindstone Island, Magdalen Islands.

162. CARYCHIUM EXILE H. C. Lea. La Rocque 1935a: 34, Wakefield; Fairy Lake, Hull.

163. CARYCHIUM EXILE CANADENSE (Clapp). La Rocque 1935a: 34, Wakefield.

164. CEPAEA HORTENSIS (Müller). Sheppard 1830: 194, bank near the plains of Abraham. Bell 1858: 56, Brandy Pots Id., Hare Id.; ibid., p. 100: mouth of Magdalen River; p. 101, five miles up Magdalen River; p. 105, Ruisseau de la Grande Carrière, between Gaspé Bay and Griffon Cove on the St. Lawrence (? AL). Whiteaves 1863: 105, extending from Métis to Gaspé Bay. Hanham 1893: 66, Barachois. Hanham 1897: 98, introduced at Quebec, plains of Abraham (cf. Sheppard record, above). Schmitt 1906: 279, Anticosti, very common. Provancher 1890: 124, Cap Rouge; Lyster, Anticosti; Magdalen Ids., recorded as Helix nemoralis. Dall 1905: 20, Anticosti; Barachois; Gaspé, Johnson 1906: 73, Quebec; p. 74 (Helix subglobosa), shore of St. Lawrence, 200 miles below Quebec (quoting De Kay); p. 75, Gaspé; along the St. Lawrence (quoting Binney and Bland); p. 78, Gaspé; Percé; Barachois; Gaspé Basin; p. 78, Anticosti; Wreck Harbor, East Cape. Vanatta 1914: 223, Magdalen Ids.; Basin, Grindstone, and Allright. De Champlain 1929: 102, Rimouski; Percé at 1,200 ft.

165. CEPAEA NEMORALIS (Linnaeus). Packard 1863: 424, Anticosti; Magdalen Ids.; Entry Id. Latchford 1884: 1052 (Helix hortensis), Anticosti (corrected later to C. nemoralis).

166. CIONELLA LUBRICA (Müller). D'Urban 1860: 97, Rouge River Valley. Packard 1863: 424, Magdalen Ids.: Entry; Mingan Ids.: Niapisca Id. Whiteaves 1863: 106, Rivière du Loup; Trois Pistoles; Métis Lakes and along the Restigouche; Montreal Mountain. Packard 1867: 290, Mingan Ids. Latchford 1884: 1052, Anticosti. Latchford and Poirier 1885: 224, six miles from Ottawa; New Edinburgh; Hull. Taylor and Latchford 1890: 58, Ottawa District. Hanham 1893: 66, Barachois. Hanham 1897: Isle d'Orléans. Vanatta 1914: 223, Magdalen Ids.: Basin, Grindstone. Hart 1929: 104, Abitibi region.

167. COLUMELLA EDENTULA (Draparnaud). Whiteaves 1863: 107, Rivière du Loup; valley of the Marsouin; along the Restigouche; at Métis. Heron 1880: 40, Ottawa District. Latchford 1885: 227, Hull. Provancher 1890: 130, Canada. Hanham 1897: 101, Island d'Orléans. Vanatta 1914: 223, Magdalen Ids.: Basin Id.

168. DEROCERAS LAEVE (Müller). Packard 1863: 424, Anticosti. Whiteaves 1863: 105, Lower Canada, abundant. Heron 1880: 39, Ottawa District. Provancher 1890: 133, unspecified. Hanham 1893: 66, Barachois. Hanham 1897: 98, Quebec District. (All cited under Limax campestris). Schmitt 1904: 279, Anticosti, rare (Agriolinas borealis Westerlund). Dall 1905: 45 (Agriolimax hyperboreus Westerlund), Ungava; Labrador. Hart 1929: 104 (Agriolimax campestris), Abitibi region, plentiful.

169. DEROCERAS RETICULATUM (Müller). Packard 1867: 289, Labrador; Strawberry Harbor and Square Island (Limax agrestis). Provancher 1890: 133, imported from Europe (same name). Hanham 1897: 98, Quebec District (same name). Dall 1905: 45, Ungava (same name). Unpublished record: Hillcrest Farm, Shawville, Que., in cellar, 1940.

NOTE. All the above records are assumed to refer to D. reticulatum, but the possibility remains that some may be genuine D. agreste (Linnaeus). A.L.

170. DISCUS CRONKHITEI (Newcomb). Bell 1858: 100, mouth of Magdalen River (Helix striatella); p. 101, Magdalen River (same name); p. 108, Lake St. John (same name); D'Urban 1860: 97, Rouge River Valley (same name). Packard 1863: 424, Magdalen Ids.:

Entry Id.; Mingan Ids.; Fright and Niapisca Ids. (same name). Whiteaves 1863: 106, Lower Canada, common everywhere (same name). Packard 1867: 290, Mingan Ids. (same name). Heron 1880: 40, Ottawa District (same name). Latchford 1884: 1052, Anticosti (Patula striatella). Latchford and Poirier 1885: 264, Woods, Chats, (same name). Provancher 1890: 129, unspecified locality (same name). Hanham 1893: 66, Barachois (same name). Hanham 1897: 99 (Pyramidula striatella), Quebec District. Vanatta 1914: 223 (P. cronkhitei anthonyi). Magdalen Ids.; Grosse Isle, Basin Id.; East Cape, Coffin Id., Grindstone Id. Hart 1929: 104, Abitibi region (same name).

171. EUCONULUS CHERSINUS (Say). D'Urban 1860: 97, Rouge River Valley (Helix). Packard 1863: 424, Mingan Ids.; Fright Id. Packard 1867: 290, Mingan Ids. Whiteaves 1863: 106, Quebec. Heron 1880: 40, Ottawa District.

172. EUCONULUS FULVUS (Müller). Bell 1858: 100 (Helix egena), mouth of Magdalen River. Packard 1867: 289 (Conulus Fabricii), Strawberry Harbor. Latchford 1884: 1052 (Conulus fulvus), Anticosti. Latchford and Poirier 1885: 264, Woods, Chats, same name. Provancher 1890: 115, Hull. Hanham 1893: 66, Barachois. Hanham 1897: 99, Quebec Region. Vanatta 1914: 223, Magdalen Ids.; Basin, Grindstone. Hart 1929: 104, Abitibi region.

173. GASTROCOPTA ARMIFERA (Say). Whiteaves 1862: 458, Cove Fields, Quebec. Whiteaves 1863: 106, Plains of Abraham, Quebec. Latchford 1885: 225, Hull. Provancher 1890: 129, Plains of Abraham. Hanham 1897: 101, Island of Orleans; Lévis.

174. GASTROCOPTA CONTRACTA (Say). Whiteaves 1862: 458, Island of Orleans. Whiteaves 1863: 106, same locality. Heron 1880: 40, Ottawa District. Latchford and Poirier 1885: 265, Woods, Chats. Provancher 1890: 129, Ile d'Orléans.

175. GASTROCOPTA CORTICARIA (Say). Heron 1880: 40, Ottawa District. Taylor and Latchford 1890: 57, listed only.

176. GASTROCOPTA HOLZINGERI Sterki. Taylor 1893b: Hull side of the Ottawa River (Pupa Holyingeri).

177. GASTROCOPTA PENTODON (Say). Heron 1880: 40, Ottawa District. Provancher 1890: 129, locality unspecified. Vanatta 1914: 223, Magdalen Ids.; Grindstone Id. Latchford and Fletcher 1884: 97, Hull (Pupa curvidens). Taylor and Latchford 1890: 58 (Vertigo curvidens), Ottawa District. Hanham 1897: 101, Id. of Orleans (same name). Latchford 1884: 1052 (Vertigo pentodon), Anticosti. Hanham 1897: 101, same name, Id. of Orleans.

178. HAPLOTREMA CONCAVUM (Say). D'Urban 1860: 96, Rouge River Valley. Whiteaves 1863: 106, Lower Canada. Provancher 1890: 110, Cap Rouge; Hull, etc. Latchford 1884: 1052, Anticosti. Hanham 1897: 98, Quebec City.

179. HAPLOTREMA CONCAVUM MINUS (Ancey). Heron 1880: 40 (Helix concava). H. B. Baker 1930: 412, Ottawa.

180. HAWAIIA MINUSCULA (Binney). Small and Symes 1882: 59, Eardley (Zonites m.). Latchford 1885: 2: 214, same locality, same name.

181. HELICODISCUS PARALLELUS (Say). D'Urban 1860: 97, Rouge River Valley (Helix lineata). Packard 1863: 424, Magdalen Ids.; Entry Id. Whiteaves 1863: 106, throughout the district, but not abundant. Heron 1880: 40, Ottawa District (Helix lineata). Latchford 1884: 1052, Anticosti, same name. Provancher 1890: 111, Gaspé to Texas. Hanham 1893: 66, Barachois. Hanham 1897: 99, Quebec District. Vanatta 1914: 223, Magdalen Ids.; Basin, Grindstone.

182. HYGROMIA STRIOLATA (C. Pfeiffer). Whiteaves 1862: 458, Cove Fields, Quebec (H. rufescens). Whiteaves 1863: 106, Quebec,

same name. Latchford 1893c: 132, Id. of Orleans, same name; introduced at Ottawa. Hanham 1897: 99, Quebec, St. Sauveur, St. Charles River, Id. of Orléans, Lévis.

183. LIMAX FLAVUS Linnaeus. Provancher 1890: 132, Canada, presumably Quebec.

184. MESODON SAYANUS (Pilsbry). D'Urban 1860: 97, Rouge River Valley (Helix Sayii). Whiteaves 1863: 105, Id. of Orleans, Montreal Mountain, near Brome Lake., Restigouche River, Grenville, same name. Heron 1880: 37, Ottawa District, same name. Poirier 1883: 74, Beaver Meadow, Hull (Mesodon Sayii). Latchford and Poirier, 1885: 264, Hull; p. 264, Kingsmere. Provancher 1890: 124, usually near brooks. Hanham 1897: 100, Quebec District; Island of Orleans.

185. MESODON THYROIDUS (Say). Provancher 1890: 123, Cap Rouge. Taylor and Latchford 1890: 57, Ottawa District.

186. MESODON ZALETUS (Binney). D'Urban 1860: 96, Rouge River Valley. Whiteaves 1863: 105, Montmorency Falls. Provancher 1890: 122, Cap Rouge.

187. MESOMPHIX INORNATUS (Binney). Heron 1880: 40, Ottawa District. Latchford and Poirier 1885: 264, Kingsmere. Provancher 1890: 112, Hull.

188. MONACHA CANTIANA (Montagu). Latchford 1893c: 132, Quebec, introduced at Ottawa. Provancher 1890: 127, not found at Quebec. Hanham 1897: 99, common on cliff bordering Plains of Abraham and extending to the citadel.

189. OXYCHILUS CELLARIUS (Müller). Whiteaves 1863: 106, Montreal. Provancher 1890: 112, Montreal. Hanham 1897: 98, Isle d'Orleans; St. Charles River. La Rocque 1935a: 34, Ottawa.

190. ?OXYCHILUS DRAPARNALDI (Beck). Bell 1858: 100, mouth of Magdalen River. The record is questioned here because the locality seems so far from the urban environment preferred by this species.

191. OXYLOMA RETUSA (Lea). Whiteaves 1863: 105, banks of St. Charles River near Quebec; Métis; Matane; Ste Anne (Succinea ovalis Gould). Latchford 1884: 1052, Anticosti, same name. Latchford and Poirier 1884: 130, Hull, same name. Provancher 1890: 135, no locality specified. Nylander 1914: 141, common around Temiscouata Lake. Vanatta 1914: 223, Magdalen Ids.: Grindstone Id. Hart 1929: 104, Abitibi region. La Rocque 1932: 152, Chilcott Lake (as Pseudosuccinea columella, in error).

192. OXYLOMA VERRILLII (Bland). Packard 1867: 290, Mingan Ids. Latchford 1884: 1052, Anticosti. Provancher 1890: 136, Anticosti. Dall 1905: 57, Anticosti, young or dwarf form.

193. ?PALLIFERA DORSALIS Binney. Latchford and Poirier 1885: 264, Kingsmere, doubtful. Taylor and Latchford 1890: 57, doubtful, same locality.

194. ?PARAVITREA CAPSELLA (Gould). Whiteaves 1862: 458, Id. of Orleans, rare. This may be a misidentification; it was never confirmed.

195. PARAVITREA LAMELLIDENS (Pilsbry). Walker 1900: 94, Ottawa? received from G. C. Heron. Walker does not state whether this was from the city of Ottawa itself, or from the Ottawa region. If the latter, there is a good chance that the locality was in Quebec.

196. PHILOMYCUS CAROLINENSIS FLEXUOLARIS Rafinesque. D'Urban 1860: 96, Rouge River Valley. Whiteaves 1863: 105, Point Lévis. Heron 1880: 39, Ottawa District. Latchford and Poirier 1885: 265, Woods, Chats. Provancher 1890: 134, Canada to Texas, rare. Hanham 1897: 99, Quebec City and district, occasional.

197. PLANOGYRA ASTERISCUS (Morse). Whiteaves 1863: 106, Valley of the Marsouin River. Provancher 1890: 120, Gaspé to Lake

Superior and all New England. Hanham 1897: 99, Id. of Orleans. Vanatta 1914: 223, Magdalen Ids.: Grindstone Id.

198. PUNCTUM MINUTISSIMUM (Lea). Heron 1880: 40, Ottawa District. Provancher 1890: 116, Ottawa. Hanham 1897: 99, Quebec area. Vanatta 1914: 223, Magdalen Ids.: Grindstone Id.

199. PUPILLA MUSCORUM (Linnaeus). Packard 1863: 424, Mingan Ids.: Fright Id. (Pupa badia). Packard 1867: 290, Mingan Ids., same name. Latchford 1884: 1052, Anticosti (P. muscorum). Provancher 1890: 128, islands in the Gulf of St. Lawrence. Hanham 1893: 66, Quebec area. Dall 1905: 29, Anticosti. Whiteaves 1905: 171, Anticosti, mouth of Jupiter River.

200. PUPOIDES ALBILABRIS (C. B. Adams). D'Urban 1860: 97, Rouge River Valley (Bulimus marginatus). Whiteaves 1863: 106, citing D'Urban, same name.

201. RETINELLA BINNEYANA (Morse). Latchford 1887: 107, Buckingham, 1 mile up the Lièvre River. Provancher 1890: 114, Hull, etc. Hanham 1897: 99, Quebec area. Dall 1905: 39, Quebec. Vanatta 1914: 223, Magdalen Ids.: Grindstone Id. Hart 1929: 104, Abitibi region. Baker 1930: 198.

202. RETINELLA ELECTRINA (Gould). Packard 1863: 424, Magdalen Ids.: Entry Id. Whiteaves 1863: 106, near Brome Lake. Packard 1867: 289, Belles Amours, Labrador. Heron 1880: 40, Ottawa District. Latchford and Poirier 1885: 264, Woods, Chats. Provancher 1890: 114, Brome Lake. Hanham 1893: 66, Barachois. Hanham 1897: 99, Quebec City (Zonites radiatulus). Vanatta 1914: 223, Magdalen Ids.: Grosse Isle, Basin Id., Grindstone Id. (Vitrea hammonis). Hart 1929: 104, Abitibi region. Baker 1930: 196, Labrador; Magdalen Ids.; Anticosti; Quebec.

203. RETINELLA INDENTATA (Say). Whiteaves 1863: 106, Montreal Mountain. Heron 1880: 40, Ottawa District. Latchford and Poirier 1885: 264, Woods, Chats. Provancher 1890: 115, locality unspecified.

204. ?STENOTREMA FRATERNUM (Say). Provancher 1890: 125 (Helix hirsuta Say, with synonyms: Triodopsis hirsuta Woodward, Helix fraterna Wood, Stenotrema hirsuta Tryon). There is no other record of S. hirsutum for Quebec and judging by the synonymy given by Provancher, his specimens were more likely S. fraternum.

205. STENOTREMA LEAII (Binney). Sheppard 1830: 194 (Helix ---?), Quebec. D'Urban 1860: 96, Rouge River Valley (H. monodon Rackett). Whiteaves 1863: 105, Lower Canada, same name. Heron 1880: 40, Ottawa District. Provancher 1890: 125, Quebec. Hanham 1897: 101, Id. of Orleans; Gomin swamp (Polygyra monodon var. fraterna).

206. STRIATURA EXIGUA (Stimpson). Heron 1880: 40, Ottawa District. Provancher 1890: 114, Ottawa. Hanham 1897: Isle d'Orléans. Vanatta 1914: 223, Magdalen Ids.: Basin Id., Grindstone Id. Hart 1929: 104, Abitibi region.

207. STRIATURA FERREA (Morse). Latchford and Poirier 1885: 215, Hull. Hanham 1897: 99, Quebec area.

208. STRIATURA MILIUM (Morse). Heron 1880: 40, Ottawa District. Provancher 1890: 113, Rigaud.

209. STROBILOPS LABYRINTHICA (Say). Bell 1858: 100, mouth of Magdalen River (Helix labyrinthica). D'Urban 1860: 97, Rouge River Valley. Whiteaves 1863: 106, Id. of Orleans, Montmorenci Falls, etc. Latchford and Poirier 1885: 265, Woods, Chats. Provancher 1890: 126, Canada. Hanham 1897: 101, Id. of Orleans (Vallonia l.).

210. ?SUCCINEA AMPHIBIA. Sheppard 1830: 194, St. Louis Road, Quebec City. I cannot identify this species which is almost certainly not S. amphibia.

211. (SUCCINEA AUREA). Poirier 1883: 74, Beaver Meadow, Hull. Latchford and Poirier 1885: 58, record repeated and questioned. This is possibly a young S. ovalis or a deformed specimen of another species.

212. SUCCINEA AVARA (Say). Packard 1863: 424, Mingan; Anticosti. Whiteaves 1863: 105, Id. of Orleans. Packard 1867: 290, Mingan Ids. Heron 1880: 39, Ottawa District. Latchford 1884: 1052, Anticosti. Provancher 1890: 136, locality unspecified. Hanham 1893: 66, Barachois. Hanham 1897: 102, Quebec area. Vanatta 1914: 223, Magdalen Ids.: Grindstone Id.

213. SUCCINEA OVALIS (Say). Bell 1858: 97, Hare Id. (S. obliqua Say); p. 100, mouth of Magdalen River, same name; p. 101, Magdalen River, same name. D'Urban 1860: 96, Rouge River Valley, same name. Packard 1863: 424, common at Anticosti; Mingan Ids.: Fright and Niapisca Ids. Whiteaves 1863: 105, Lower Canada. Packard 1867: 290, Mingan Ids. Heron 1880: 38, Ottawa District. Latchford 1884: 1052, Anticosti. Latchford and Poirier 1884: 131, Hull. Latchford and Poirier 1885: 265, Woods, Chats. Latchford 1887: 107, Buckingham. Provancher 1890: 135, Gaspé to Arkansas. Hanham 1893: 66, Barachois. Hanham 1897: 102, Quebec area; St. Charles River; Quebec City. Vanatta 1914: 223, Magdalen Ids.: Basin, Grindstone, Hart 1929: 104, Abitibi region.

214. ?SUCCINEA TOTTENIANA Lea. Hanham 1897: 102, St. Charles River, Quebec City. Probably a misidentification.

215. SUCCINEA VERMETA (Say). Bell 1858: 100, mouth of Magdalen River. Whiteaves 1863: 105, Restigouche River.

216. Triodopsis albolabris (Say). D'Urban 1860: 96, Rouge River Valley. Whiteaves 1863: 105, Lower Canada. Heron 1880: 40, Ottawa District. Latchford and Poirier 1885: 264, Woods, Chats. Provancher 1890: 122, Cap Rouge. Hanham 1897: 99, Quebec area, well distributed, but not common. Nylander 1914: 141, Temiscouata Lake. Unpublished records: Meach Lake; St. Andrews, Argenteuil Co.

217. TRIODOPSIS ALBOLABRIS DENTATA (Tryon). Latchford and Poirier 1887: 350, Lièvre River; Valley of the Rouge River (D'Urban's "exoleta").

218. TRIODOPSIS ALBOLABRIS MAJOR (Binney). Provancher 1890: 122, Cap Rouge, rare.

219. TRIODOPSIS ALBOLABRIS TRAVERSENSIS ("Leach" Walker). Hanham 1897: 99, Quebec area (Polygyra albolabris maritima). La Rocque 1953: 306 (maritima).

220. TRIODOPSIS DENTIFERA (Binney). Whiteaves 1862: 458, Montreal. Whiteaves 1863: 105, near Brome Lake. Latchford 1893a: 118, Montreal east to Island of Orleans and southward to Knowlton, Eastern Townships. Provancher 1890: 123, especially in mountains. Hanham 1897: 99, St. Romuald; Ste Foye Road, Island of Orleans. Unpublished record: Alcove.

221. TRIODOPSIS FRAUDULENTA VULGATA Pilsbry. Provancher 1890: 126, Canada to Florida and Texas.

222. TRIODOPSIS TRIDENTATA (Say). Whiteaves 1863: 105, Montreal Mountain, but very rare. Provancher 1890: 125, locality unspecified.

223. VALLONIA ALBULA Sterki. Dall 1905: 23, Eastern Canada to B.C.; Quebec.

224. VALLONIA COSTATA (Müller). Latchford 1884: 1052, Anticosti. Hanham 1893: 66, Barachois. Hanham 1897: 101, both sides of the St. Lawrence River.

225. VALLONIA EXCENTRICA Sterki. Hanham 1897: 101, St. Joseph's, Quebec district, not observed elsewhere.

226. VALLONIA PULCHELLA (Müller). Bell 1858: 100, mouth of Magdalen River (Helix

pulchella). D'Urban 1860: 97, Rouge River Valley. Packard 1863: 424, Anticosti (H. minuta Say). Whiteaves 1863: 106, abundant throughout the province. Latchford 1885: 221, Ottawa District. Provancher 1890: 124, Cap Rouge. Hanham 1897: 101, Quebec District; Id. of Orleans.

227. VERTIGO BOLLESIANA Morse. Latchford and Poirier 1885: 226, Hills near Ironsides. Hanham 1897: 101, St. Joseph's near St. Romuald. Hart 1929: 104, Abitibi region.

228. VERTIGO GOULDII Binney. D'Urban 1860: 97, Rouge River Valley. Whiteaves 1863: 107, Id. of Orleans; Rivière du Loup; Montreal Mountain. Heron 1880: 40, Ottawa District. Latchford 1884: 1052, Anticosti. Provancher 1890: 130, Quebec. Hanham 1897: 101, Id. of Orleans. Vanatta 1914: 223, Magdalen Ids.: Grindstone Id.

229. VERTIGO MILIUM Gould. Taylor and Latchford 1890: 57, Ottawa District. Hanham 1897: 101, Id. of Orleans.

230. VERTIGO MODESTA HOPPII (Möller). Packard 1867: 289, Strawberry Harbor, Labrador. Latchford 1884: 1052, Anticosti. Dall 1905: 29, doubts Anticosti record, questions Ungava and Labrador records.

231. VERTIGO OVATA Say. Whiteaves 1863: 107, Montreal, questioned. Latchford and Poirier 1885: 226, Hull. Provancher 1890: 131, Canada. Hanham 1897: 101, Quebec area.

232. VERTIGO VENTRICOSA Morse. Latchford 1889: 68, Hull. Hanham 1897: 101, Id. of Orleans. Dall 1905: 31. Whiteaves 1905: 171, Rivière du Loup; Quebec. Vanatta 1914: 223, Magdalen Ids.: Basin Id., off Coffin Id.

233. VITRINA LIMPIDA Gould. Whiteaves 1863: 105, Montreal, Rivière du Loup; Trois Pistoles; Ste Anne; Restigouche River. Heron 1880: 38, "Hull mountains." Latchford 1884: 1052, Anticosti. Provancher 1890: 109, Montreal, Rivière du Loup, etc. Hanham 1893: 66, Barachois. Hanham 1897: 98, Quebec area: St. Joseph's, St. Romuald, banks of creeks running into river at St. Charles. Vanatta 1914: 223, Magdalen Ids.: Basin Id. Hart 1929: 104, Abitibi region.

234. VITRINA PELLUCIDA (Draparnaud). Bell 1858: 100, mouth of Magdalen River. Packard 1863: 424, Anticosti; Mingan Ids., common.

235. VITRINA PELLUCIDA ANGELICAE Beck. Packard 1867: 289, Labrador. Packard 1867: 290, Mingan Ids.

236. ZONITOIDES ARBOREUS (Say). D'Urban 1860: 97, Rouge River Valley. Packard 1863: 424, Mingan Ids.: Niapisca Id.; Magdalen Ids.: Entry Id. Whiteaves 1863: 106, Quebec, unspecified locality. Packard 1867: 290, Mingan Ids. Heron 1880: 40, Ottawa district. Latchford and Poirier 1885: 264, Woods, Chats. Provancher 1890: 114, Hull; Labrador. Hanham 1893: 66, Barachois. Hanham 1897: 99, Quebec area. Vanatta 1914: 223, Magdalen Ids.: Grosse Isle, Basin Id., Grindstone Id. Hart 1929: 104, Abitibi region.

237. ZONITOIDES NITIDUS (Müller). Latchford 1884: 1052, Anticosti. Latchford 1885: 213, Hull. Provancher 1890: 114, Ottawa. Hanham 1897: 99, Quebec area; St. Charles River.

238. ZOÖGENETES HARPA (Say). Bell 1858: 100, Magdalen River (Helix harpa). Packard 1863: 417, Labrador. Whiteaves 1863: 106, Montreal Mountain; Rivière du Loup; Métis; mouth of Magdalen River; Marsouin Valley (Bulimus harpa). Packard 1867: 289, Labrador. Latchford 1884: 1052, not observed on Anticosti but found in Gaspé and to Montreal. Latchford 1893c: 132, Ste Petronille, on Id. of Orleans; introduced at Ottawa. Hanham 1893: 66, Barachois. Hanham 1897: 99, Id. of Orleans and Quebec area. Dall 1905: 21, Gaspé. Hart 1929: 104, Abitibi region.

NOTE. The introduction mentioned above (Latchford, 1893c: 132) was made on the Ottawa side of the Ottawa region; it did not succeed.

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ARTICLE IV. -- On the occurrence of Freshwater shells in some of our Post Tertiary Deposits. By ROBERT BELL.

(Presented to the Natural History Society of Montreal)

The various deposits described in the following paper are of different ages and have been formed under very different circumstances, but are arranged under the same head for the sake of convenience.

MONTREAL

Early in the spring of 1858 I accompanied Mr. D'Urban, who has done much for the cause of Natural History in Canada, on several excursions to collect fossils at the localities in the vicinity of Montreal where drift shells had been discovered. In examining the sides of Mr. Peel's clay pits, which are excavated in the 120 feet terrace, we discovered a few specimens of Limnaea caperata Say, in place, in a thin layer of sand immediately above the Leda clay and more than three feet below the surface of the ground, which is level at the place. In the same bed with these fresh water shells Saxicava rugosa, Tellina groenlandica, Mya arenaria, Mya truncata and Mytilis edulis are associated; and in the clay immediately underlying it Leda Portlandica was found, but not in any abundance.

About the same time that this Limnaea was found at Mr. Peel's

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brick yard, I received a fine specimen of Limnaea umbrosa, Say, from Sir Wm. Logan, who obtained it from the thin bed of sand at the same locality. A Cyclas and L. umbrosa were found by Dr. Dawson amongst marine shells thrown out of a ditch on Logan's Farm.* I have collected specimens of the latter at the same place and believe them to be contemporaneous with the marine shells.

I might mention that the ponds on the highest part of Montreal Mountain, about 700 feet above the level of the sea, teem with Limnaea umbrosa and L. caperata, besides numerous other species of our common fresh water Gasteropods. Ponds, with all these species living in them, may have existed in the same situation when Montreal Mountain was an island in the sea which covered the surrounding plain, and from them the rills running down its sides may have carried the specimens found in the sand which was then being deposited around its base.

*Canadian Naturalist, vol. iv, p. 36, vol. 11, p. 422.

GREEN'S CREEK.

Green's Creek enters the Ottawa in the Township of Gloucester, on the south side, about ten miles below Ottawa City. Here, the Leda clay has afforded a larger number and more interesting variety of fossils than at any other locality. At low water, which is generally in the month of September, the shore of the Ottawa for about two miles from the mouth of the creek upwards, is strewn with nodules of all manner of curious shapes washed from the base of the steep bank of clay which rises from high water mark.

In looking over the collection of nodules from this locality in the Museum of the Geological Survey, I found two specimens of Limnaea stagnalis, one of our commonest living species. Both had been partially filled with clay, now a hard stone, while they still retained their original shape. With the exception of the splendid Limnaea megasoma, which inhabits the Ottawa valley, this is the largest species in Canada. It was called L. jugularis by Say, but is identical with the European L. stagnalis. One meets with these shells in almost every warm marsh or pond on the south side of the Ottawa, and it is interesting to know that their progenitors lived in this country while the Leda clay was being deposited and a deep sea covered their present abode.

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Not only have marine shells and this fresh water species been found at Green's Creek, but also the remains of two seals, three kinds of fish, leaves, wood and nuts of land plants, three or more species of marine algae and specimens of Asteracanthion polaris Müll, the most abundant starfish now inhabiting the Lower St. Lawrence, and future researches at this locality will no doubt add many more fresh water, as well as marine species, to our Post Pliocene fauna.

TERRACES AROUND LAKE ONTARIO

On the south side of Lake Ontario a remarkable ridge* composed of loose materials, extends from Sodus in Wayne County westward to Lewiston on the Niagara River, a distance of 100 miles, and a continuation of the same ridge has been traced to the head of the lake. The general contour of this "Lake Ridge," as it is called, is parallel to the present shore of the lake, its extreme variations being three miles at its least and eight at its greatest distance from the shore. A carriage road runs along its summit, the general elevation of which is so uniform, that when the road is tolerably straight, a traveller can be seen as far as the eye can reach. A remarkable feature of this ancient boundary of the lake is that it declines more or less on the inland, as well as the lake side, thus constituting a true ridge, which damming the surface water, forms marshes on the upper side. This fact can be no objection to the supposition of its marking a former boundary of the lake, for we find similar ridges now forming along low exposed shores. The rarity of shells in it, is perhaps as a circumstance in favour of the supposition of its being of fresh water, and not marine origin, as shells are very scarce along the open shores of the great lakes, and one might search a long time in similar ridges now forming without finding any.

The elevation of the summit of the ridge above Lake Ontario opposite Middleport is 185 feet, opposite Albion and Brockport it is 188 feet. The distance comprised within these three observations is thirty miles, in which the elevation of the ridge varies only three feet; in Wayne County it is estimated at 200 feet. Fragments of wood, shells, &c., are found embedded in it; the shells were not collected by Mr. Hall himself but he has no doubt

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of their occurrence. In his annual report of 1838 he remarks that Uniones are said to have been found in the ridge. Should the shells of this deposit prove to be of fresh water origin, and since no marine shells have been found in it, we might be induced to believe that Lake Ontario once stood

* The facts here given in regard to the "Lake Ridge" are derived from Hall's Geology of New York, Part IV.

far above its present level, and that a barrier which kept it at that level has since been removed; but on the contrary, as there is no actual proof that such a barrier did exist, we have reason to conjecture that it was formed while the sea stood at that level. Allowing the water by which the Lake Ridge was thrown up to have been 175 feet over the present level of Lake Ontario, we should have about 410 feet as its elevation above the present sea level; this corresponds exactly with that of the littoral deposit in Nepean on the Ottawa, in which Sir Wm. Logan has found marine shells, and it would not be surprising if future researches prove them to be contemporaneous - perhaps also with the terrace on the back of Montreal Mountain which is 50 or 60 feet higher, - for littoral deposits at considerable distances apart may be of the same age though at different elevations, as these differences may be due to an unequal amount of upheaval or to a difference in the heights to which the tides rose.

One of the numerous terraces which run along the north side of the lake will no doubt be found to mark an elevation corresponding to that of the "Lake Ridge" on the south; probably the "Pine Ridge" which is so well marked is the one. The late Mr. Roy, who long ago levelled the terraces behind Toronto, gave 108, 208, 280, 308, 344, 420, 680 and 762 feet as the elevations there of ancient beaches above Lake Ontario.

Dr. Dawson the other day showed me two specimens of a Melania and one of Unio ellipsis from a sandy deposit not far from Toronto.* They are described as having been found immediately above the Silurian rock in the drift about five miles from the Asylum. Both the Melanias are filled with sand but on the back of the Unio there is a thin layer of clay which again is impregnated with sand. The deposit from which these shells are derived may be of the same age as the ridge on the other side of the lake.

Professor Chapman informs me that he has collected specimens of a Planorbis in sand and gravel about 46 feet above the lake in the neighbourhood of Belleville.

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Although some of the lower terraces behind Toronto might have been formed by the lake when at a greater elevation, the higher ones were doubtless formed during the period of the glacial drift.

I will mention a circumstance which may be one reason for inferring that Lake Ontario was filled with fresh water at the time when the sea stood at one of the best marked zones of the Post Pliocene formation to the eastward. It is well known that the very common little bivalve Tellina groenlandica delights in salt water which is largely mixed with fresh and is most abundant in friths or bays where rivers enter the sea. In descending the St. Lawrence from Quebec, it is the first marine shell one meets with and is extremely abundant when the upper limit of other marine species is reached. When the salt water extended up the valley of the St. Lawrence to some point between Montreal and Kingston, we should naturally expect the same state of things to have existed. Now, in the drift deposits at Prescott, at about 250 feet above the sea, Tellina groenlandica is very abundant and I did not observe any other species; from this fact, and considering the situation of the locality, it appears evident that the estuary was here diluted with fresh water when the sea stood at this level, but the argument is open to many objections.

NIAGARA FALLS.

In 1859 an opportunity was afforded me of examining the ancient bed of the Niagara River near the Falls. Between the Clifton House and the toll-gate below, a deposit of gravel and sand, rich in fluviatile shells, occurs between the ancient bank of the river, and the cliff overhanging the present gorge. At a spot on the road-side where a quantity of the sand and gravel had been excavated, I collected the following species: -

1. Planorbis bicarinatus.
2. Physa heterostropha.

* Collected by B. Workman, Esq., M.D.

3. Limnaea caperata.
4. " stagnalis.
5. Melania Niagarensis.
6. " conica.
7. " acuta.
8. Paludina decisa.
9. Amnicola porata.
10. Unio gibbosus.
11. " complanatus.
12. " ellipsis.
13. " rectus.
14. Margaritana marginata.
15. Cyclas similis.
16. Pisidium dubium?

A portion of a land snail, probably Helix albolabris was also

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found. Many of the bivalves were perfect, having the valves closed, and from the position in which they were found, appeared to have lived on the spot where they are buried. These shells may have lain here for thousands of years, although their geological date is extremely recent.

Similar terraces occur on Goat Island, and along the American side of the river from the Falls to the whirlpool. A mastodon's tooth was found in this fluviatile terrace opposite Goat Island, at a depth of nine feet below the surface, but it does not follow from this, that the mastodon lived at the time of its formation, for the tooth might have been washed from an older deposit. These terraces being all on the same level, and the Unionesoccurring in them in the position in which they had lived, are facts which imply that they were once connected so as to form a continuous stratum, extending over the position occupied by the present gorge, and also that they have been deposited in a tranquil widening of the river, like that between Chippawa and Buffalo. They also afford a conclusive proof that the Falls have receded. These terraces are described by Hall, Lyell, and Ramsay.

TERRACES AROUND GEORGIAN BAY.

The more inaccessible parts of the Province have naturally received less of the attention of scientific men, than those in the vicinity of her cities or along her great thoroughfares. I am not aware of anything having yet been published in regard to the lake terraces of the region under notice, with the exception of a paper by Sandford Fleming, C. E., on "The Valley of the Nottawasaga,"* from which I extract the following:-

"There are appearances in various parts of this region which lead us to infer that the waters of Lake Huron like those of Ontario, formerly stood at higher levels than they at present occupy. Parallel terraces and ridges of sand and gravel can be traced at different places winding round the heads of bays and points of high land with perfect horizontatlity, and resembling in every respect the present lake beaches; one of them particularly strikes the attention in the Bay of Penetanguishene, at a height of about 70 feet above the level of the lake; it can be seen distinctly on either side from the water, or by a spectator standing on one bank while the sun shines obliquely on the other, so as to throw the deeper parts of the terrace in shadow. The accompanying section, sketched† from a cutting a little below Jeffrey's tavern, in the Village of

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Penetanguishene, will serve to show the manner in which the soil has been removed from

*Read before the Canadian Institute in 1853, and published in the first volume of the Canadian Journal.

†This sketch resembles a cross section of a side-hill road, where the earth has been excavated on the upper and thrown to the lower side.

the side hill and deposited in a position formerly under water, by the continued mechanical action of the waves. Not only does the peculiar stratification of the lower part of the terrace confirm the supposition that it was deposited on the shore of an ancient lake, but the fact that such excavations have been made in this landlocked position, where the waves could never have had much force, goes far to prove that the lake stood for a long period at this high level.

"Another ancient beach mark about 15 miles inland, and as far as yet ascertained, about the same level as the one at Penetanguishene, can be traced for a long distance in the township of Tosorontio. It passes through the tract of burnt land already described, the soil of which being pure sand, in all probability formed the shoals of a lake extending to the north and east, the outline of which is approximated by the dotted line* marked from 70 to 80 feet high on the accompanying map. Nor are these the only traces of old lake beaches met with in this region, although the dense forest nearly everywhere covering the surface is a great impediment to their easy discovery. In the Township of St. Vincent, near the village of Meaford, besides a very conspicuous one, corresponding in level with those already mentioned, several others of lesser note are found at various heights; at Owen Sound, also, they are remarkably well defined; while Cape Croker, on the western side of Georgian Bay, viewed even from a distance and the well remembered shape of the Giant's Tomb, on the eastern, show striking evidences of having been acted on for ages by the storms of Lake Huron, when at a higher level.

"It has been said that some of these terraces are estimated at 70 or 80 feet above the level of the lake; by drawing a contour line coinciding with this height around the lower part of the valley, it is found that the high ridge of sand now in some parts blown up into dunes near the mouth of the River (Nottawasaga), will form a narrow neck of land (supposing the lake at its former level), stretching across from shore to shore, and resembling in many respects the "Burlington Beach," on Lake Ontario, and also "Fond-du-Lac," on Lake Superior; like the first it encloses a bay of considerable depth of water, but of far greater area. That this ridge has been formed in a manner precisely similar to those two, by the sand washed from the adjoining shores, there is great probability, in fact there is good reason to believe that the same natural agents, at present in active operation moving the outlet of the river eastward, have also formed this upper ridge by transporting the materials of which it is composed, from the base of the escarpment in Collingwood.

"In attempting to arrive at the geological age of these ancient beaches, it will be necessary to show whether their position, at a consi-

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derable height above the level of the lake may be attributable to a gradual elevation of the land or to a subsidence of the water. The last hypothesis seems the most tenable, since the first would involve a local upheaval only, and an inclination of the plane of the terraces at variance with their apparent horizontality. Should further researches prove the existence of terraces or other indications of old beaches on the western margin of Lake Huron corresponding in height with those discovered along the eastern shore, the supposition that the level of the water has been lowered by the wearing away of some barrier will be strongly supported;

* This line encloses a subtriangular space, having one corner in the north of Nottawasaga, another in the centre of Essa, and the third in the north-east corner of Vespra.

and if this be allowed as a reasonable explanation for these geological monuments, we have then, by drawing contour lines coinciding with their level the means of discovering the probable position of this barrier. From all that I can learn regarding the relative levels of the country these lines would pass over the peninsula between Lakes Huron and Erie at some distance inland from the River St. Clair and would if continued eastward along the shores of Lake Erie fall within the summit of the neck of land through which the chasm of the Niagara River is cut."

The northern part of the Township of Nottawasaga is situated on the extensive sandy plain above alluded to, which was no doubt formerly covered by an extension of Georgian Bay to the south-eastward. The whole has a general slope up from the bay, but here and there a ridge of gravel or coarser sand interrupts its general uniform aspect. Hurontario Street, running from Collingwood Harbour almost due south through the township, was carefully levelled by Wm. Gibbard, C. E., and it appears from his profile section of the street, that from Collingwood to the north side of the Pretty River at the Village of Melville or Nottawa Mills, a distance of two and a half miles, the ground rises very regularly from the edge of the water to an elevation of 138 feet, or at the rate of about 55 feet per mile. At the Pretty River a change begins both in the character of the surface and in the rate of its inclination, which continues regularly for three and a half miles further at 47 feet per mile. Thus, at a distance of six miles from the present shore, the surface has attained an elevation of more than 300 feet above the level of the lake; beyond this it rises irregularly and much more rapidly. It is evident that the bank of sand and gravel on the north side of the Pretty River continued for a long time to be the shore of the lake. The layers of sand and gravel are arranged exactly as on a modern beach, and among them I noticed several thin irregular beds of a light grey or white colour, composed principally of carbonate of lime. In the cutting through the top of this ridge the common land shells Helix al-

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bolabris, H. tridentata, H. Sayii, H. alternata, and H. fuliginosa were collected, at from three to four and a half feet below the surface.

About a mile south of Collingwood, a shallow cutting for the road, exhibits the arrangement of the beds of sand and gravel, which at the base of the exposure dip southward at an angle of 35° and are overlaid to the surface by unconformable horizontal layers. Here, from the surface to a depth of three feet, Planorbis trivolvis and Helix fuliginosa, H. tridentata and H. thyroides? were found. The summit of this rise is 78 feet above the level of the lake, and from its plotted section appears to have been thrown up by the waves when the edge of the lake ran along the base of its northern slope.

There are a few specimens of Melania conica in the Geological Museum, from a railway cutting in sand near Collingwood.

The greater part of the town of Owen Sound is built on a loose deposit of gravel and fine sand at the head of a long arm of the Georgian Bay of the same name. The flat formed by this deposit slopes gradually up from the head of the bay towards the falls of the Sydenham River, which has cut its way through it, and is bounded on either side by terraces of Silurian limestone or marl. Fresh water shells were observed in abundance wherever a section of the sand was exposed, and also, in one place, Helix alternata the most abundant land shell on the shores and islands of Lake Huron.

The following species were collected in different places in the most central part of the town. One of these, on the bank of the river was about nine feet above the level of the lake; the others appeared to be a little higher.

1. Limnaea umbrosa.
2. Planorbis campanulatus.
3. Planorbis bicarinatus.
4. " parvus.
5. Melania acuta.
6. " Niagarensis.

7. Melania conica.
8. Paludina decisa.
9. Valvata sincera.
10. " tricarinata.
11. Amnicola porata.
12. Cyclas similis.

About a mile from the mouth of the river, or following the upward course of the valley, the road is cut through a slight elevation in this lacustrine deposit and here also fresh water shells were found embedded in the sand, but neither the species nor individuals

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were so numerous as in the same deposit nearer the head of the bay. I had no means of ascertaining the elevation of this spot above the lake, but it seemed to be more than 30 feet and the shells bore evidence of great antiquity.

The terraces before alluded to as bounding this flat are capped with fine sand and their summits appeared to exceed 80 feet above the level of the lake. They are well marked, and extend for miles along each shore of the Sound. At Peiett's Harbour, or the French Village on the west side of Owen Sound and about twelve miles from the town of the same name, two steep and very well marked lake terraces rise, one above the other, near the water's edge. They are both composed, as far as I examined them, of shingle mixed with a little silt. The summit of the upper one appeared to be about 100 feet above the lake and is in all probability the continuation of the upper terrace running round the head of the Sound, while the lower one corresponds to that on which the town is built.

When Lake Huron was at a sufficient elevation to form the higher of these terraces, it was probably connected by a wide expanse with Lake Erie, which is also proved to have stood at this high level from the fact of a ridge holding fragments of decayed wood and fresh water shells, running along its southern side at an elevation of 150 feet above its present level.

MONTREAL, Feb. 4th, 1861.

RECORDS OF GASTROPODS COLLECTED IN WESTERN OHIO -- A CORRECTION

CLARENCE F. CLARK

On page 21 of STERKIANA No. 6, 1962, is a small error. Miami County should have listed under it Union Township, Section 7, August 12, 1944, Ludlow Creek. At this site, Goniobasis livescens (Menke) ... 7. The next county title should be Paulding, and under it Paulding Township, Section 20, June 24, 1945, as it now appears.